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THE THIRD LISTERIAN ORATION

[We publish herewith the third Listerian Oration, which was delivered by Lord Moynihan of Leeds in Winnipeg, on August 29th.]

The proposal to found this Oration was first put forward at the meeting of the Canadian Medical Association in Winnipeg in 1922, by Dr. John Stewart of Halifax. His suggestion met with instant approval, and after two years of organization and the collection of the necessary funds, the first Oration was delivered at the Ottawa meeting¹ by Dr. Stewart himself, whose association with Lister had been long and intimate, dating from the days of Dr. Stewart's work with him in hospital. In 1927, the second Oration was delivered by Sir Charles Sherrington, at the meeting in Toronto.²

It must be with a very special pleasure that Dr. Stewart views the consummation of the plan so happily conceived by himself. His introductory remarks on the present occasion are a fitting and peculiarly pleasant overture to Lord Moynihan's Oration, which we think it will be agreed is entirely worthy of its great subject. It was given before a very large audience in the Winter Club in Winnipeg. A further interest was added to the occasion by the presence of two of Lord Lister's other former house surgeons, Sir StClair Thomson, and Mr. L. V. Cargill, F.R.C.S.]

H.E.M.

DR. JOHN STEWART'S INTRODUCTION

IN the duty which has been assigned me of introducing to you our illustrious guest there is an element of make-believe, for many of you have a longer and more intimate acquaintance with him than I. And yet not all of you have stood on the same platform with him, as I once did. I will tell you how it was. Three years ago the British Medical Association met in Edinburgh and celebrated the centenary of Lister's birth. It was not on the exact date according to the calendar. The fifth of April, 1827, had already been celebrated in London, in Glasgow, and other cities. It had been observed all over Canada from coast to coast, and indeed all over the world, but the Council of the Association decided to postpone their celebration until their annual meeting in July, which was to be in Edinburgh, the city he so dearly loved and where he had lived for many happy years, and where also they would have

the largest possible gathering of medical men in Britain. The commemoration was observed in a most loyal and loving manner. It was indeed the outstanding event and from that crowded week one whole evening was devoted to the memory of Lister. The meeting was held in a very large hall. Every seat was occupied and on the platform sat in all the gorgeous panoply of their robes of office a great number of the most eminent leaders of our profession and many distinguished men from all fields of science. The chairman was the late Earl of Balfour, who gave a brilliant and memorable review of the life and work of Lister. Four men had been selected to give short addresses. There was Professor Tuffier, now, also, alas, the late Professor Tuffier, of Paris, a great exponent of French surgery. There was Sir William Watson Cheyne, disciple, assistant, and first successor of Lister, and there was Dr. Harvey Cushing, who came from our

1. *Can. M. Ass. J.*, 14: 1007, Oct. 1924.

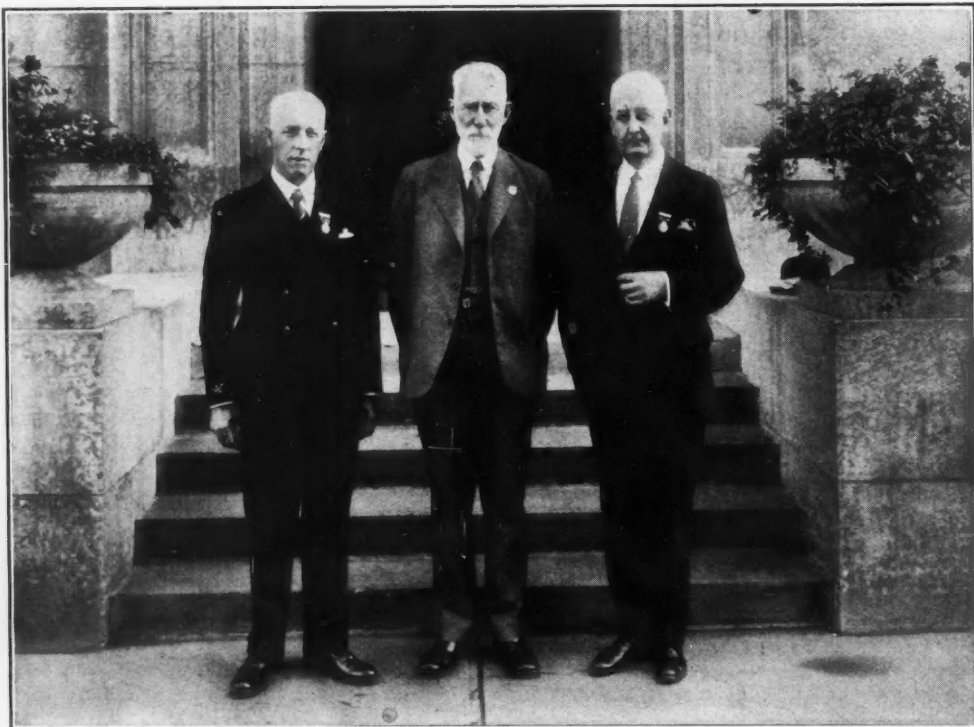
2. *Ibid.*, 17: 1251, Oct. 1927.

cousin's house over the way, but whom for himself and his work's sake we should like to have with us for our very own. These were all famous men.

Then there was me. How and why? For many it must have been an enigma. I knew I must have had a number of fond and foolish friends to whom it seemed fitting that I should speak on this occasion. Life is full of enigmas, let us leave it at that. I cannot describe the sense of anxious misery which weighed me down as the minutes passed and I felt my turn was coming. I felt my task was impossible. The vast audience seemed to grow bigger and bigger every moment; it seemed as if the whole population of the United Kingdom was crowding in to do homage to Lister, my dear master and friend, and who was I to speak of him at such a time in such company and to such an audience? I knew there were friends there in front of me who wished me well, and though I was not aware of it, there was at least one in the glorified cloud

of witnesses behind me who perhaps divined the sense of utter incapacity which possessed me, and who also wished me well. The time came. I saw eyes looking at me. I rose. Then I felt a firm hand on my shoulder and a quiet, clear voice said: "Good luck." I turned and faced the cheery smile of Sir Berkeley Moynihan; and with his accolade on my shoulder I carried on and said my piece.

You will understand, then, how it is that along with a deep sense of the honour the Association has done me in assigning this duty to me, there is a lively sense of gratitude and of affection to him who sympathized with me and helped me when I was "Going over the top." And now I introduce to you your third Listerian Orator, a man of clear, alert mind, kind, warm heart, strong, steady, skilful hand, a great surgeon from a land of great surgeons, from a city of famous surgeons, the President of the Royal College of Surgeons, the Right Honourable Lord Moynihan of Leeds.



THE THREE HOUSE SURGEONS OF LORD LISTER
AT THE ANNUAL MEETING, WINNIPEG, AUGUST, 1930

Left to right:—Mr. I. Vernon Cargill, London; Dr. John Stewart, Halifax, N.S.;
Sir StClair Thomson, London.

THE ORATION

BY THE RIGHT HONORABLE LORD MOYNIHAN OF LEEDS,

President, Royal College of Surgeons, England

LISTER—THE IDEALIST.

Ideals are not so much for capture as for pursuit.

1. THE BENEFACTOR

LISTER, whom we commemorate to-day, is in my deliberate judgment the greatest material benefactor of mankind the world has ever known. Many years ago I said of him that he had saved more lives than all the wars of all the ages had thrown away. His nephew and biographer, Rickman Godlee,¹ a predecessor of mine in the Chair of President of the Royal College of Surgeons of England, assured me that of the multitude of tributes paid to Lister this one had made a special appeal to him. And when, on his assuring me a second time I expressed not merely delight but surprise, Godlee explained, "Lister, you see, was a Quaker."

Lister created a new world for surgery. He made it possible for us to prevent infection in new wounds, and to grapple more successfully than had ever before been imagined with wound infections already established. This he did not so much by inventing new methods, or by discovering yet more powerful antiseptics, but by the enunciation of a new principle, namely, that surgical infection is due to living microbes with their power of infinitely rapid propagation in wound effusions and discharge. Thus briefly stated it does not sound to us in these days very revolutionary; yet it is hard to imagine, nay I believe it is impossible for any living man to conceive, what this work of Lister's has meant for all the world, for ever.

The art of surgery has existed from the very birth of time. The oldest human remains show that the craft of surgeons had been exercised upon them. The manipulative skill of surgeons, their courage, rapidity, and dexterity, had excited the wonder and admiration of men for centuries. Yet no man ever practised his craft on any case, however simple, without terror and

dismay, without foreboding, too often justified by the terrible result. Lister's gentle hands lifted from men the heaviest load of suffering and of sorrow they could ever have to bear, and opened the gates of mercy and of compassion to mankind.

What was the surgical world into which Lister was born? In 1801, John Bell, of Edinburgh, in his *Principles of Surgery* writes thus of hospital gangrene:

"When it rages in a great hospital it is like a plague; few who are seized with it can escape. There is no hospital, however small, airy, or well regulated, where this epidemic ulcer is not to be found at times; then no operation dare be performed. Every cure stands still. Every wound becomes a sore, and every sore is apt to run into gangrene. It has been named the Hospital Gangrene; and such were its ravages in the Hotel-Dieu of Paris (that great storehouse of corruption and disease) that the surgeons did not dare to call it by its true name; they called it the rottenness, foulness, sloughing of the sore. The word hospital gangrene they durst not pronounce, for it sounded like a death-knell; at the hearing of that ominous word the patients gave themselves up for lost. In the Hotel-Dieu this gangrene raged without intermission for two hundred years, till of late, under the new Government of France, the hospital has been reformed. A young surgeon (says an ancient French author) who is bred in the Hotel-Dieu, may learn the various forms of incisions, operations too, and the manner of dressing wounds, but the way of curing wounds he cannot learn. Every patient he takes in hand (do what he will) must die of gangrene."

and elsewhere Bell speaks of a hospital as a "House of Death." Sir James Simpson, the discoverer of chloroform, said that the patient on the operation table ran a risk greater than that of the soldier on the battlefield of Waterloo. The most eminent French surgeon of his day speaking of the dangers of even the slightest wounds, said: "A pin prick is a door open to death"; and that the performance of an abdominal operation should be "classed among the methods of the executioner." Lister himself said that hospitals were "little short of pest-houses." In the *Life of Pasteur* by Vallery Radot, we read:

"During the siege of Paris (1870-1871) Nélaton in despair at the sight of death of almost every patient after operation declared that he who should conquer

purulent infection would deserve a statue made of gold."

Already Lister was at work.

In surgery when things go wrong, it is not only the patient who suffers. One of the greatest of English physicians used to say that no patient ever kept him awake for five minutes. I do not envy that frame of mind. The surgeon who holds the life of a patient in his hands cannot but suffer if, contrary to expectations, untoward events take place. If in such conditions a surgeon does not worry, I should suppose that he has not made the best choice of a profession. For the relatives and friends, too, the mental suffering is often greater than it is even for the patient himself; their ordeal, when one whom they love is bearing the heaviest trial of a lifetime, and they themselves must stand by impotent, may be almost beyond endurance. In that immortal little book, *Rab and his Friends*, the tragedy that oppresses is not so much the crudity and the horror of contemporary surgery, or the ordeal of the dear old woman Ailie as the anguish and impotence of James.

A century ago, the greatest surgeon in England was Astley Cooper. In his *Life* is told the story of his operation on King George IV. in the year 1821, for the removal of a wen upon the head. It is almost laughable now to read of the unwillingness of the King's surgeons, Everard Home and Cline, to undertake so perilous a task, and to learn how Astley Cooper, when urged by his colleagues, expressed no little reluctance to take so anxious a responsibility. He speaks of the operation in terms which to us now appear absurd, fearing that "it might by possibility be followed by fatal consequences." He says, "I saw that the operation if it were followed by erysipelas would destroy all my happiness and blast my reputation. . . ." "I felt giddy at the idea of my fate hanging upon such an event. . . ." "I am certain that if anything happened to the king that at any rate I should leave London and live in retirement."

Such was the world into which Lister came. The change since his day is beyond the reach of tabulation. Statistics, as I said long ago, may prove anything, even the truth. But statistics are not here available. For Lister's work is not primarily concerned with lessening the mortality of operations performed before his time; thus operations were few and largely con-

cerned with matters now regarded as of minor degree. Lister's conception, and that alone, made possible all further adventures in medicine, opened for us a safe entry into the great cavities of the body, and so laid bare to our inspection those pathological conditions which hitherto had been studied only upon the post-mortem table. To the work made possible by Lister we owe our knowledge of the "pathology of the living"; our power to correlate symptoms with their co-temporary organic cause. As Hippocrates gave us the method of inductive logic, and Galen the deductive method, so Lister created the method, though he rarely if ever employed it, of direct research—the method by which investigation is carried out upon man's body at the very moment when pathological changes are causing grave disturbances of health. The method of analogical research, of inquiry conducted upon animals to elucidate the separate items in the composite picture which disordered physiology presents in man, was not created by Lister, but was made safe by him; and because safe it was possible very considerably to extend it. Analogical research offers a surgical career for physiologists, a career which has proved so attractive that the weightier methods of direct research have perhaps been not a little disregarded by them, to the injury of medicine. The application of Lister's principles to medicine as well as to surgery has been both laggard and incomplete. The influence of infection upon a multitude of diseases which, unhappily perhaps, still tarry within the territory of the physician, is even now not adequately appreciated. To William Hunter, who in 1900, in his study of pernicious anæmia first propounded the doctrine of focal infections, we owe a debt by no means adequately recognized.

Lister's work has therefore many implications. He perfected the ancient methods of surgery; he created opportunities for the performance of new operations, so complex, so intimate, so miraculous, as to be beyond the scope of the most adventurous imaginations of fifty years ago. He made safe the way for the explorer in animal experimentation, and made it possible for us to correlate, to annotate, the complex aberrant physiology of man by inquiry into the normal physiology, or the physiology in which purposeful changes had been invoked in animals.

Strongholds of disease, hitherto impregnable, surrendered to his irresistible advance. Measures of desperation gave place to methods of deliberation; anxious and perilous experiment to confident experience. He offered to the physician an elucidation of many diseases the etiology of which had hitherto been inexplicable. No man has ever laboured so earnestly, and none more profitably, in the service of humanity. The imaginative energy inherent in his labour is imperishable. Our surgical work to-day is the creation of his mind, for as StClair Thomson has most aptly quoted:

"Most can raise the flowers now
For all have got the seed."

II. THE QUAKER

Who then was Lister? How did it happen that so great opportunities fell into such competent hands? Lister was born into the aristocracy of science. His father, Joseph Jackson Lister, a successful man of business, was known at home and abroad for his application of the science of optics to problems of the compound microscope. Lister owed to his father more than the microscope—invaluable as that gift proved to be. He owed him immunity from all financial anxiety—the nightmare, if sometimes the blessing in adequate disguise, of the young surgeon who desires to dedicate himself to the service of his art rather than to the exigencies of his purse. Lister from the first had no minor worldly worries; he was free to choose his own course in life, to linger or to hasten where he thought best, and to use all opportunities which offered themselves, or which he himself created. It was not only material advantage which came from his father. Over and above all these, infinitely greater than them all, there came to him as a parental legacy certain ideals of conduct and of thought—ideals which are an authentic part of, and dominate, a household bred in that stern Quaker faith which holds relentlessly to what it believes to be right, and which regards the slightest perversion of truth in thought, word, or act as heinous and deadly sin. The Quaker is called upon to follow his "light," a radiance from the central light of the spiritual universe, which Edward Burroughs called the "Light of Christ in the conscience." "If a man is to be called upon to follow his 'light' he must

be helped to correct his subjective seemings by the gathered objective wisdom of the race, as expressed in scientific truth, in historical knowledge, in established instructions, and in the sifted literature of the world."²

This reverence for truth, this unquestioning acceptance of it wherever found, which Lister learnt in the home atmosphere, grew with his growth, and strengthened with his strength. He could neither use nor tolerate empty or ornate phrases. It was not so much error as sin to be slovenly in pursuit of truth; truth must always be sought earnestly, without passion, without prejudice; no pains must be spared to make a statement "trustworthy." In his home he learnt to value and to adopt another ideal—unselfish service of his fellow men. As we trace Lister's footsteps to his glorious goal, we are at first perhaps inclined to dwell upon material things—his natural gifts, his training, his opportunities, his genius as experimenter; only later do we see that the key to his success lies in knowledge of his ideals—ideals brought to medicine from a most austere English home, in which rare gifts were dedicated to study of nature and to service for others. "The Quaker Home," Sir George Newman tells us, "became a calm refuge from the storm, a place of tenderness and sympathy where diligence, thoroughness, reliability were more or less habitual. The very furniture came to express plainness combined with worth." Of Quakers in the eighteenth and nineteenth centuries, Newman writes³:

"The Quakers by reason of their faith were denied entrance to many careers open to others. They were often driven therefore to find scope for their talents in a study of nature, and it was their scientific study of nature which developed their inductive faculty. They had one other characteristic; their innate public spirit habituated them to public service which was peculiar in being both benevolent and disinterested. These two factors greatly contributed to the production of a selective type of character expressing itself in scientific work or in social and political life."

III. THE SURGEON

London—Scotland—London

Lister's ambition was to work in London. London, through all his wandering, was his goal. Fate does not often lead a man direct to his destiny, but drives him along devious paths, confronts him with frivolous obstructions, assails him with petty or malignant hostilities,

seems eager to discourage him, but brings him, if proved worthy, to his allotted place at last. Lister was no exception. He was checked and baffled and rebuffed, and made to follow a long and tortuous route before London finally received him, with no enthusiasm, with tolerant scepticism, or even with open derision and disbelief. He left London when he was 27, and returned when he was 49.

Lister's career in Scotland was a probationary period of twenty-two years. He went to satisfy an ideal, to train himself by contact with other surgeons, and by experience gained in other hospitals. Let me quote what his nephew says:

"Lister was filled with anxiety at the thought of finding himself in the false position of a young consulting surgeon who might have no personal acquaintance with the obscure diseases, and only an imperfect knowledge of the more common cases which would be brought before him. He was still more apprehensive of the mischief which his want of experience might cause his patients, and, in a less degree, of the effect which mistakes might have on his chance of success."

Lister was thrice, four times happy in his training. The impressive influences came from Sharpey, a great physiologist, who most unhappily in the development of his own science had driven a wedge, not yet removed, between descriptive anatomy and functional anatomy; from Wharton Jones, slovenly and ill-kempt, despised, yet fired with a zeal for knowledge, eager in his quest for truth; and in Scotland from Syme, and one other. Lister's mind and character were good material for their workmanship, and they all must share the credit of his immortal labours.

EDINBURGH

Upon the advice of William Sharpey, Lister left London and went north to work with James Syme, Professor of Surgery in Edinburgh. There could have been no wiser choice. Lister's diffidence, modesty, shrinking timidity of self-assertion were so exaggerated as to be almost faulty, and a prejudice to his confidence in his own work. James Syme was the very antithesis of all this. He was a warm-hearted, upright, fearless, outspoken man, who thought that truth was a spark to be struck from controversy. His mind was original, his temper "tetchy." He was not only ready, but athirst for polemics, and he was a gladiator without

mercy, relentless for the victory of truth, as he saw it. Yet he was acclaimed as the greatest surgeon in Europe. His relations with Lister became intimate, for after two years Lister married his daughter Agnes. We seldom read of her in Godlee's pages, but we learn enough to realize the full surrender she made to Lister and all his work, and of her endless devotion and so willing sacrifice. No one can read of her without emotion. In Agnes Syme, Lister found the ideal of whom his heart was in search—the inseparable companion, the prudent counsellor, inspirer, helper, critic, consoler, most exactly annulling his native defects.

Lister, as that most attractive orator StClair Thomson, his old House Surgeon, has told us, was by nature friendly, with a warm heart kept, as is the English way, under vigilant control, expressing itself in act rather than in words. Lister's words were few indeed, chosen with almost timid care, never allowed to strain or overstate the exact truth. Romance, or picturesque or appealing phrase, all that an artist would call "colour" are not to be found in Lister. The group of great Scotsmen whom Lister joined during this first Edinburgh period were very different. Has there ever been so fine a group of men in Edinburgh? Among them came first and foremost James Syme. There were also Allan Thomson who enticed and welcomed Lister to Glasgow; Matthews Duncan, afterwards of St. Bartholomew's; Thomas Keith, of whom Lister wrote, "he has the earnest loving spirit of the real surgeon." Dr. John Brown, Lister's friend, the prophet of this set of Scots, who embalmed in his immortal booklet, *Rab and His Friends*, both the spirit of service which dominated these men, and the bitter tragedy of surgery in their time. All of them were men of great natural ability and originality, confident in opinion and judgment—everyone a master. All had the power to inspire friendship and enthusiasm, everywhere the "personal touch" was felt. Lister, too, felt it, and it evoked a quick natural response in his own heart. It strengthened his "inner light," but he wisely and characteristically maintained those outward signs of demure unostentation which had come to him as a birthright and had been strengthened by precept and practice. His

patients—it did not matter whether rich or poor—were his personal responsibility—they were men and brothers; his students became his friends, and he found, to his surprise, that he could inspire enthusiasm, as well as faith and trust.

Lister's visit to Edinburgh, in pursuit of his ideal, was well worth while. Like many others, he made a hero of James Syme. The daily intimacies, the discussions, the contemplation of a great spirit at work, all helped to build up both mind and method, to strengthen his purpose. His task was:

" to watch the master work and catch Hints of the proper craft, tricks of the tool's true play."

hoping that he would be privileged "to act to-morrow what he learnt to-day."

His devotion to duty, his most lovable modesty, attracted everyone who knew him or worked with him. But in Edinburgh his opportunities for acquiring the technical skill required by his craft were not adequate to his desires; and he did not venture to teach operative surgery until he had visited Paris and increased his manipulative skill by practice on dead bodies. He refused to teach his small class (I wonder if any of them realized their privilege) the rudiments of surgical pathology until he himself had studied the phenomena of inflammation as seen by the microscope in the web of a frog's foot. He sought for personal conviction of the truth of his teaching. "Don't think, try the experiment," said John Hunter to Jenner. "Don't teach, learn," said Lister to himself. As all the world knows, in so learning and preparing himself he opened up new realms of knowledge and awakened in himself a restless and insatiable enthusiasm for further inquiries. Writing to his brother in 1855, just after he had given his first lecture at No. 4, High School Yard, Edinburgh, he declares, "I feel I have undertaken a most responsible duty; how much may depend on the principles of practice which I impart to these young men. May I be enabled to discharge the duty faithfully." He had only been a few months in Edinburgh when we find him exclaiming, "My only wonder is that persons who really love Surgery for its own sake are so rare," and in 1857 we find the old Quaker spirit of repression still at work when

he confides to his mother "that a mode of life so much in accordance with my tasks as mine now is, must be too pleasant to be proper to me."

Nor must I forget to add here a passage which reveals Lister's innate modesty. Writing to his father in 1854, when he had resolved to try his fortunes in Edinburgh, he states:

"I must not expect to be a Liston or a Syme, still I shall get on. Certain it is, I love Surgery more and more, and this is one great point; and I believe my judgment is pretty sound, which is another important point. Also I trust I am honest, and a lover of truth, which is perhaps as important as anything. As to brilliant talent, I know I do not possess it; but I must try to make up as far as I can by perseverance."

Herein Lister does himself injustice, for this Edinburgh phase showed that he had a capacity for "taking pains" (which is not genius but its opposite, yet its ally) beyond any man who ever played a part in shaping the destinies of surgery.

Though always possessed of the gravity of his task, and grimly in earnest about it, he had with rectitude of mind, and discipline of conduct, a fund of humour. He could not give way to the bursts of laughter which so often shook the bodies of his Scottish companions in Edinburgh, but there was a twinkle always in his eye, a smile hung at the corners of his mouth, and under the surface there was always a ripple of silent joy. We see all these in that portrait which hangs in the Royal College of Surgeons:

"His brow spreads large and placid and his eye
Is deep and bright, with steady looks that still
Soft lines of tranquil thought his face fulfill
His face at once benign and proud and shy."

And the "wise rare smile, sweet with certainties."

He was as happy as a school-boy when his wife and he set out on their not infrequent holidays. It was only when matters of right thinking and right doing were in question that he could not bear to trifle. He held so consistently and steadfastly to his own ideals all through his long life—he reached the age of 85—that a lapse which happened just after he came under the dominating influence of James Syme, gives us a moment of almost comic relief. Lister had no doubt as to his own nature; it was peace-loving. In a letter to his father, written just

after his arrival in Edinburgh, he submits himself to an analysis in which this passage occurs:

"I am by disposition very averse to quarrelling and contending with others, in fact, I doubt if I could do it, though I have never tried much."

Such a bland uncontentious attitude of mind was unthinkable to James Syme. His ideas were clear cut, his teaching dogmatic, and his opinions part of his personality. Criticism or opposition he regarded as insults aimed at himself, as injuries to truth, and accordingly the proper defence was to malign or belittle the opposition. And he used unsparingly the most trenchant of weapons. Even in his earliest days he had taken part in the most embittered controversies, from the time of his quarrel with Liston who had befriended him. He quarrelled with Fergusson, Argyll Robertson, Lizars, and was a protagonist in the warfare between Pluggites and Anti-Pluggites. When Lister joined him, Syme still had many opponents who required "slaying," and so earnest was Lister's belief in the justice of Syme's contentions that he entered the lists on behalf of his hero, and was entrusted with the lethal dispatch of a very worthy man, William Adams of London, one who had done much to improve the art of orthopædic surgery. I am sorry to relate that Lister here descended to personalities, his sole lapse in this respect. For this his father intervened with:

"I suppose he has given occasion for something of personality—that I think I observe in thy tone and which in public discussion it is in general desirable to avoid—but I shall be glad if the matter drops without further rejoinder and reply. Is there not danger in assailing a class, as I think thou dost, by implication at least, thou mayest be making thyself enemies of strangers, beside consuming thy much occupied time."

Lister took the hint, forthwith abandoned acrimonious personal controversy and never embarked again upon the boundless and turbulent seas of polemical vexation. It is certainly the case that later, on the eve of leaving Glasgow, he contended with the Managers of the Royal Infirmary, and that on the eve of leaving Edinburgh for good, he made statements which disturbed surgeons in London, distinguished for their apathy towards him and their incredulity of his work. In both these cases, however, there was no slightest personal venom; it was his opponents who confused cause with personality. Ever after that early and very startling lapse

he set down what he believed to be the facts and with infinite and unruffled patience left the truth to speak for itself. This attitude of mind, this realization of a great ideal, he shares with two other great Englishmen—William Harvey and Charles Darwin. Having produced their evidence and stated their inference, having encountered doubt, denial, derision, with serene confidence, they left the final verdict to the judgment of posterity.

GLASGOW

The Glasgow phase of Lister's life lasted from his 33rd to his 42nd year—from 1860 to 1869, when he returned to Edinburgh for a second probationary period. In the early years at Glasgow his energies, his experiments, and his observations were directed to throw light on the nature of suppuration and the cause of putrefaction. The Glasgow infirmary was perhaps one of the unhealthiest in the Kingdom. Though wards were already overcrowded, the managers were anxious to place additional beds in them.* Wound infections of the gravest type were regarded as almost inevitable and the conditions made Lister "sick at heart." But a change was imminent.

One of the great romances of surgery is concerned with the almost casual manner in which during a walk Dr. Thomas Anderson, Professor of Chemistry at Glasgow, mentioned to Lister the researches of Pasteur which dealt with questions of fermentation and putrefaction. The papers written by Pasteur were not only new in statement, but new-fangled. They were unconventional; and convention, the daughter of attainment but the mother of scepticism and decadence, is often inspired by a zeal for denial. Her motto should be "*Ich bin der Geist der stets verneint*." As seems inevitable, therefore, these articles had been generally received with scepticism, ridicule, or indifference. To Lister, however, they made an instant appeal, for he seemed to realize in a moment their strict relevance to the problem of infection in wounds. His search for an ideal or perfect method of treating

* They were worthy ancestors of the recent managers who to their eternal discredit have destroyed the wards in which Lister worked. We raise our monuments to the great conquerors in war, but the battleground of the victor over suffering and death itself has been ruthlessly laid waste.

wounds—a method which would exclude or destroy the “all-pervading vibrios” which he was convinced were the cause of “putrefaction” began forthwith. From the very first, “micro-organisms” were as real to him as though he could see them; they were everywhere, in the air, on every single thing, engaged in every operation. The surgeon who was to conquer or control them must consider everything as hostile, and in his attack on them might not relax his vigilance for an instant. The world knows now how he laboured without ceasing to attain his ideals. There was constant, unsatisfied, yet undismayed search for the ideal antiseptic, for the ideal ligature, for the ideal dressing, for an ideal system of preventing infection, as corollaries to a great principle. He was busy in his wards and class-room all day, and engaged on experiments and tests of “trustworthiness” in his small laboratory at home every evening. His search for perfection in all these details continued to the very end of his professional career; he never reached his ideal in any of them. *Ideals are not so much for capture as for pursuit.* At first, influenced by Pasteur’s observations, he regarded the air as the greatest source of danger; slowly and reluctantly he convinced himself that the surgeon’s fingers and instruments were more to be feared than the air. His opinions and his methods changed for the very reason that his ideals were unalterable. The question has often been raised, not always without unworthy motives, as to Lister’s real contribution to the later development of what is known as “Aseptic Surgery.” I do not recognize “Aseptic Surgery” apart from “Antiseptic Surgery,” for in no operation I have ever performed have antiseptics been absent. We do not allow them to touch wound surfaces if this contact can be avoided; but we never fail to use them for the preparation of the skin, or ligatures, or other material employed during operation. Lister everywhere distinguishes between the “prophylactic” and the “therapeutic” use of antiseptics. He writes: “The original idea of the antiseptic system was the exclusion of all microbes from wounds,” and again, “during the operation to avoid the introduction into the wounds of material capable of inducing septic changes in it, and secondly, to dress the wound in such manner as to prevent the subsequent entrance of septic mischief.”

Again—“In wounds already septic attempts are made with more or less success to restore the aseptic state,” and finally, “In speaking of the antiseptic system of treatment I refer to the systematic employment of some antiseptic substance so as entirely to prevent the occurrence of putrefaction in the part concerned, as distinguished from the mere use of such an agent as a dressing.” Lister was the parent of both methods, if any distinction is to be drawn between them.

EDINBURGH AGAIN

In 1869, the long deferred return journey to London began at last. James Syme resigned the Chair of Clinical Surgery in Edinburgh, and Lister was appointed to succeed him. A letter addressed to him by the students of Edinburgh shows us that Lister’s true stature had not yet been measured and that his outstanding genius had not yet been recognized. “We believe,” they told him, “that your researches in various departments of science and your contributions to its literature, have caused your name to stand next to that of Mr. Syme amongst the living surgeons of Scotland.” I have no doubt Lister treasured the letter, perhaps regarded the compliment as unduly favourable. Syme was his hero among living surgeons, John Hunter of the great dead. It was a very different verdict that the students of Edinburgh gave when, in 1876, the second term of service in that city was over. All men were then devoted to him; in their eyes he was a triumphant success both as surgeon and as teacher. Many of them indeed had recognized the advent, and had followed with boundless admiration the career of one whom even then they regarded as immortal, and whom they revered for sterling personal qualities.

On his arrival in Edinburgh, he devoted his spare hours to a new field of inquiry. Before leaving Glasgow he had repeated Pasteur’s more critical experiments, realizing that if a surgeon was to equip himself to fight his natural enemies—the omnipresent microbes—he must learn to know them, the details of their life and habit.

In Edinburgh he began what would now be known as bacteriological research; an improvised room was his laboratory. With extraordinary ingenuity he devised both apparatus and tech-

nique; he submitted his cultures to critical experiments. In 1874 he ventured to publish some results of his inquiries; he sent a copy of his paper to Pasteur with a modest and gracious covering letter—the first approach he made to his great contemporary. Pasteur replied, perceiving at once how Lister had been misled in the interpretation of the results of certain of his experiments; he also recognized, as no one had done before, that his new correspondent was a man who possessed the highest kind of scientific genius. Let me quote from Pasteur's letter:

"I confess to my shame that I was, and am still, very little acquainted with your work, although for a long time keenly desirous to know about it. Your pamphlet and the analysis of it, which my friend has made for me, add to my impatience and my regret. I am extremely surprised at the precision of your manipulation, and at your perfect comprehension of the experimental method, and it is an enigma to me that you can devote yourself to researches which demand so much care, time, and incessant painstaking at the same time as you devote yourself to the profession of surgery, and to that of chief surgeon to a great hospital. I do not think that another instance of such prodigy could be found amongst us here."

Pasteur, probably the greatest experimentalist the world has ever seen, put his finger unerringly on the source of Lister's genius; it was his mastery of the experimental method. Pasteur, of course, did not know that Lister had been applying such methods to the elucidation of the deepest problems in physiology and pathology for twenty years. The gift of devising crucial experiments is surely among the greatest and rarest given to mortal man; happily it is not seldom combined with an equally important power, that of drawing just deductions. Great discoveries do not come, have indeed I think never come, by the way of serendipity; they are the fruits of patient, accurate, often protracted, labour. They may not be found in the direct path of inquiry which is being followed, but in diverticula from it. Yet they are found.

It was in the latter part of the second Edinburgh period that another aspect of Lister's nature developed; he became a man with a mission, filled with zeal. The zealot is always inspiring and sometimes amusing. In 1875, the British Medical Association met in Edinburgh. Burdon Sanderson presided in the section of Physiology. Seven papers were down for reading, the first by Professor Lister, who was to demonstrate the results of his inquiries into

fermentation. He occupied the whole morning, and the remaining six papers were taken as read. When the same Association met at Plymouth in 1871, he was invited to give the address in Surgery. He began at 11 o'clock, and at 12.55 the President of the Association passed him a reminder that he was breaking the rule which confined the address on Surgery to the space of one hour. At the International Medical Congress at Philadelphia he occupied in all three and a half hours in discoursing upon the Antiseptic method. Lister had become almost a bore! He had always been highly sensitive, most considerate of the right of others and of all the courtesies of life. What then was the nature of the change which had come over him? It was the fever which comes over great men when they become eager for the fulfilment of an ideal—the ideal of Service. He was convinced he had found a pearl of great price, one in which his fellow surgeons must be made to believe and to value aright for the good of humanity. And the world held back; taught by experience, it suspected that what Lister had found was only a pebble which in the ecstacy of enthusiasm he had mistaken for a pearl. They thought of him as men had thought of Pascal, that he was merely a "ramasseur de coquilles"—a collector of shells. Yet within those shells, what pearls were found!

LONDON AT LAST

The last stage of Lister's career as an active surgeon, the second London period lasting from 1876 to 1892 carried him from his 49th to his 65th year, when, as his nephew has written, "the melancholy hour struck for his retirement from King's College Hospital." In no previous phase of his career was the strength of his idealism so tested. No other phases required so consummate a courage.

Of Lister's reception in London, of his life there, of his failures, and final triumph, I need say little. The story has been told by his old house-surgeon, Sir StClair Thomson, in addresses in which intimate personal knowledge, great sincerity and good humour find literary expression. These addresses will be read with interest and delight so long as the name of Lister endures.

It was not until 1881, during this final London period, that Lister realized a most

fundamental and significant truth, namely, that surgeons had a most powerful ally against their foes in the living tissues of the body. It was his own original studies that convinced him of this inherent power of strong defence. In 1883, he therefore at once appreciated the significance of Metchnikoff's discoveries, just as in 1865 he had quickly and confidently realized the bearing of Pasteur's discoveries on the practice of surgery. Lister, like other great minds, had a remarkable power of grasping the relevance of discoveries made by others; he realized almost intuitively their bearing on matters of theory and practice. He was both an expert midwife to parturient ideas and their prolific parent. Some of his earlier critics denied his originality, and gave all credit to Pasteur. This was prejudice run riot. The clue, the inspiration, the impulse, came from a knowledge of Pasteur's work; but it was Lister alone who had the power to see its significance in relation to surgery. And then the work did not end, it began. The acorn is not the oak. It is not plagiarism to use another's work in a new fashion. "If I light my candle from another that does not affect my property in the wick and tallow," said Dean Swift. The arresting relevancy of apt quotation may have all the naked form of novelty. Yet novelty is often error for those who are unprepared for it, from the refraction with which it enters into their conceptions. And after all was not the greatest original and creative mind also the most assimilative? Is not *Love's Labour's Lost* the only play of Shakespeare with an unborrowed plot?

It was a grief to Lister, a disappointment and wholly inexplicable, that his colleagues, particularly his senior colleagues, could not perceive that he was applying a "new Principle" to the treatment of wounds. As far as they could see he was simply applying a new dressing. They, whose minds were subdued by the inertia of old preoccupation, were shocked to find that Lister, having discovered a satisfactory dressing, was not content to abide by it. He was forever altering the details of his technique. Even Paget himself, a sober and most cultured mind, with unrivalled power of felicitous and musical expression, regarded the antiseptic system as merely a method of wound dressing, and many critics

found it hard to understand the quick succession of attempts which Lister never seemed tired of making to reach his ideal method of treating wounds. They indeed were content with the ancient methods. A rather contemptuous and patronising tolerance is to be observed in the literature of his time, even in his later years. In 1877 the *Lancet* wrote:—"In many quarters Mr. Lister has acquired the reputation of a thoughtful, painstaking surgeon, and has done some service to practical surgery by insisting on the importance of cleanliness in the treatment of wounds although this has been done by the glorification of an idea which is neither original nor universally accepted." I beg you to note those delicious phrases, "In many quarters" and "some service." Intellectual myopia, hypermetropia, astigmatism, are here concurrent phenomena. One of the older Leeds surgeons, Tom Nunneley, to the anger of his junior colleagues, asserted that, tried side by side, the new methods had not proved better than the old. Such men, said Bacon, "find ease to be of the negative side, for when propositions are denied there is an end of them."

Then in 1893—the year following his retirement from practice—came the disaster of his life. Lady Lister and he went to Rapallo, in the Italian Riviera, for their usual spring holiday; Lady Lister caught pneumonia, and in four fatal days Lister was left to face the world alone. Once only, so far as I am aware, did Lister refer publicly to his loss. It was when he received the freedom of Edinburgh in 1898. He spoke of her as a "gift I cannot name, but which was to me a source of unspeakable blessing." The light went out of his life; there were no more experiments; he had no longer any heart for them. His own end came, as you know, 19 years later. He died at Walmer, Kent, February 10, 1912. He carried here with him papers and notes relating to a series of investigations which he had made on the processes concerned in suppuration. This paper was to include unpublished observations he had made while House Surgeon at University College in 1851, others gathered during his first period in Edinburgh, but most of them carried out in his earlier years in Glasgow before the "antiseptic rush" began. Something lies hidden in these researches

which Lister thought important for the advance of medicine. The paper was never written—hand, head and heart failed him. Where in medical history shall we find a parallel instance of devotion to our profession?

IV. THE MAN

Lister conferred gifts of inestimable value on mankind; all medical men, without exception, acknowledge their indebtedness to him. The prevailing opinion is that Lister was able to do what he did because of his supreme intellectual gifts. You will not accuse me of underestimating those gifts; I have tried to place them in a truer light than before. What is, nevertheless, so often overlooked is his possession of those qualities to which I have now been calling your attention; his great heart, his matchless humanity, his unquenchable faith, his flawless intellectual integrity in pursuit of knowledge. Without his moral sublimity, without the "soul-making," as Keats called it, Lister could never have changed the face of surgery. His idealism, his enthusiasm, his ardour, his earnestness, and his courage were as essential as his experimental genius. Lister himself recognized this. When receiving the Copley Medal of the Royal

Society in 1902, he said he had often thought that if he did deserve credit, "it was at the time when, perfectly convinced of the truth of the principle on which he acted, and persuaded alone of the enormous importance to mankind of being able to carry out that principle in practice, he worked for years with exceedingly little encouragement from his professional brethren." That inward light, the "light of Christ in the conscience," which shone so steadily in Lister is a beacon which will continue to shine on through the ages, giving heart to great men who battle with prejudice, that emotional reaction of ignorance to truth, which is the real obstacle to every advance.

Of Lister, above all men, it may be sung:

"When the ear heard him, then it blessed him; and when the eye saw him, it gave witness to him. He delivered the suffering that cried; the dying that had none to help them; kindness, meekness and comfort were in his tongue. If there was any virtue, and if there was any praise, he thought on these things. He is buried in peace, but his name liveth evermore."

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EXPERIENCES WITH A HIGH CARBOHYDRATE-LOW CALORIE DIET FOR THE TREATMENT OF DIABETES MELLITUS*

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THE purpose of this report is to describe experiences with a diet of high carbohydrate-low fat content in the treatment of diabetes mellitus. These demonstrate that, providing the fat content is kept very low and the caloric value is within the minimum requirements, it is possible, in the majority of cases, to make the diet of the diabetic quite attractive even without the use of insulin. Where insulin is necessary, the dosage and frequency of administration is less than with diets ordinarily in use. A practical advantage of this form of treatment is that special articles of food, such as bran muffins, gelatines, etc., are not necessary. Two characteristic metabolic features associated with these diets are: (a) low plasma cholesterol; and (b) nitrogen retention in the early stages. These will, again, be referred to in greater detail. There is both experimental and theoretical basis for this type of diet.

Energy is available from three kinds of food, namely, carbohydrate, fat and protein. Each of these foods may be given in three different ways, that is, in normal amounts and in amounts above or below the normal. From the theory of combinations, we learn accordingly that it is possible to construct twenty-seven different types of diet with respect to their carbohydrate, fat, and protein contents. A study of the literature shows that the great majority of these have been made use of. Arguments of apparently equal force have been presented for and against both excesses and restrictions of these three different forms of foods. The literature on the subject is quite voluminous, but, as it is readily available, it is unnecessary to give a summary here. A few relevant observations may, however, be made.

In the early days of the treatment of diabetes, carbohydrate restriction was the

logical practice. It was soon discovered, however, from clinical experience alone, that a carbohydrate-free fat-protein diet invariably led to disaster. Later, Allen clearly demonstrated that dogs, when partially depancreatized to the border-line of diabetes, could readily be made diabetic by a fat-protein diet. With such a diet dogs manifest the same spontaneous downward progress observed in the human subject. In the human subject, Wilder¹ and his co-workers presented, as Lusk puts it "as clear cut a piece of metabolic artistry as may well be conceived". These workers showed that a potential diabetic can be transformed into a completely diabetic individual merely by the administration of the time honoured carbohydrate-free diet of meat and fat. This experiment also explains the production of the constant D:N ratio in the diet of Mendel and Lusk's diabetic man.² Many other such data could be referred to. The conclusion from these observations is, however, definite. Fat-protein diets from which carbohydrates are excluded find no logical place in the present day management of the diabetic.

Two experiences met with in our clinic last year may be of interest here. In both cases the histories are essentially the same. One of the patients happened to be a physician and the other a fifth year medical student. Neither sought medical attention for about a year after the discovery of the glycosuria, and in each case carbohydrate was practically excluded from the diets. When they were first seen the striking features were (a) marked weakness, (b) absence of glycosuria, (c) presence of ketonuria, (d) mild degrees of hyperglycæmia in the fasting state, and (e) exceptionally high plasma cholesterol; in one case (the physician) it was 1.510, and in the other 0.980 per cent. Both of these patients were obviously heading for severe diabetes and coma. With the introduction of carbohydrates, both patients im-

* From the department of metabolism, the Montreal General Hospital, Montreal, Canada.

proved. In the case of the medical student it was possible to give a diet of 125 grams of carbohydrate, 130 grams of fat and 50 grams of protein without insulin; the physician required 70 units of insulin a day to maintain a diet consisting of 150 grams of carbohydrate, 140 grams of fat and 60 grams of protein. In both cases the urines are now free of sugar and acetone bodies and the blood sugars are normal in the fasting state. The student's plasma cholesterol is now normal and the physician's diet is maintained on 30 units of insulin daily and his plasma cholesterol is 0.302 per cent.

Differing from the former type of diet the effects of protein are still problematical. Protein restriction still has its adherents. Lusk,² in discussing effects of the different forms of treatment, suggests that the mere reduction of the amount of protein given to the diabetic patient may be the sole cause of the beneficial result observed. Joslin also tends towards the view that a high protein intake affects the metabolism of the diabetic adversely. Writing as late as 1927, however, Lyall³ has shown that very high protein diets appear to be undesirable only because of their potential sugar content and specific dynamic action. Protein up to two grams per kilogram of body weight apparently had no deleterious effect on sugar tolerance. On looking over our older records which, in some instances, show diets of high protein content, I found the data were unconvincing either for or against protein restriction. As none of our diets of adults have, however, contained more than about 125 grams of protein, very few can be said to have received more than two grams of protein per kilogram of body weight. However, two grams per kilogram of body weight represents more than the average consumption of protein by normal individuals.

Fat, perhaps, presents the greatest difficulty with regard to the interpretation of results. On theoretical grounds, one naturally fears large quantities of fat, as it is the incomplete utilization of this food with the resultant flooding of the body with acetone bodies which kills the diabetic. On the other hand, as Joslin puts it as late as 1928, "one cannot treat diabetes successfully without increasing the quantity of fat Even with the

most modern ideas on treatment, the statement still holds that fat forms the bulk of the diabetic patient's diet". The usual protective measures against this necessity are to give just a sufficient amount of fat to maintain body weight and to prevent ketosis. Nevertheless, workers such as Petré⁴ and Newburgh and Marsh⁵ have given diets of very high fat proportions with apparently no harmful results. An analysis of these diets, however, shows that they were not only low in carbohydrate and protein content, but also tended to be low with regard to calories. Is it, therefore, possible that undernutrition explains the satisfactory results? As a matter of fact, the majority of the older diabetic diets which have proved successful, have, on analysis, been found to be of relatively low caloric content. Undernutrition, therefore, must have played its part.

Apropos of possible quantitative effects of undernutrition, a recent investigation by the writer⁶ may here be referred to. In an attempt to determine statistically whether insulin does or does not improve carbohydrate tolerance, it was found that the reductions of dosages of insulin in the cases studied could largely be explained on the basis of the diets (undernutrition) given.

Perhaps one of the best examples of the effects of undernutrition may be found in a diabetic met with recently (No. 1082/30). This patient contracted the disease in 1904, at the age of 37 years. He was admitted to one of the medical wards of this hospital in February of this year with cirrhosis of the liver and died of its sequelæ and not of diabetes; at the time of death the diabetes was fairly well controlled. The interesting part of his history is that since he developed diabetes in 1904 he has been on an oatmeal (van Noorden) diet. Investigation showed that though he was taking approximately 150 grams of fat daily, his diet was only about 30 per cent above his basal caloric requirements. He had led an active life. Therefore, undernutrition alone kept this diabetic alive for twenty-six years.

The above are a few brief observations which may be made and which demonstrate that our knowledge of the specific action of any particular form of food material is quite imperfect. We may now turn to a discussion of the basis of the diet under consideration, namely, a diet

of high carbohydrate-low fat content and caloric value within the minimum requirements.

The idea is not new. The literature shows that there has been a gradual tendency to increase the carbohydrate content of the diet of the diabetic. Without alteration, however, in the proportion of the other food materials, namely, fat and protein, this practice has naturally resulted in the increased use of insulin, either with regard to amount or frequency of administration.

There appear to be good reasons for the use of liberal quantities of carbohydrates. Firstly, as Joslin⁷ points out, it is more rational to tend towards than to deviate from the standard diet of healthy people; secondly, in those countries where the diet consists largely of carbohydrates, the diabetes is mild, and lastly, the diets of those diabetics who have lived long, whether they showed sugar or not, were those whose carbohydrates have never been long reduced to a very low quantity. At the New England Deaconess' Hospital⁸ on a chance day, it was found that the patients received, on an average, 125 grams of carbohydrate, 92 grams of fat and 63 grams of protein. The character of the diets in our clinic has also been gradually changing, but because of the following observation.

For a number of years, and until recently, the great majority of our diets, except in very mild diabetes, consisted of approximately 50 grams of carbohydrate, 150 grams of fat and 50 grams of protein, whether the patients did or did not require insulin. Though these diets tended to be high in fat they had two favourable attributes, namely, that (a) the fatty acid to glucose ratio was less than 2.0, and (b) they tended towards undernutrition. This probably explains our low and practically normal death rates. (Last year our actual to expected death ratio was 110 per cent of the normal and during that time there were no deaths amongst our children). In view of these satisfactory results, except for the fact that the diets were not very attractive, because of their low carbohydrate content, there was no reason to alter them. In addition to this there was, however, the following experience which led to alteration of our usual practice.

We have now, in our clinic, a large and increasing number of patients some of whom

are very mild, but definite, diabetics, and the most one can positively say about the remainder of this group, judging from their carbohydrate metabolism, is that they are potential diabetics. The entire group now includes 359 patients. In the majority of these cases, glycosuria was accidentally discovered, either during routine examination for some other physical ailment, or while applying for life assurance. As they were accumulating, an attempt was made to measure the effects of subjecting some of these persons to rigid carbohydrate restrictions combined with undernutrition. Our routine in such cases is to obtain blood sugar time curves when these patients are first seen and then again at six months' intervals, or as near to that period as was possible. In the study of these cases and for purposes of control, diets were given to one-half of the group only. The subjects were selected alternately in order to conform to random sampling. The diets consisted, on the average, of 50 grams of carbohydrate, 150 grams of fat and 50 grams of protein. Though the total number of this group of patients was 359, the data of 235 only are dealt with, as the remainder were either very irregular in their appearance at the clinic or, between visits, had their dietary habits altered. Briefly,* the findings of interest here were as follows:—

The incidence of improved carbohydrate tolerance, judged by the blood sugar time curves, was definitely greater in the treated than in the non-treated group. An interesting finding, however, was that, in spite of diets, not only was no improvement of carbohydrate tolerance noted in some of the treated cases, but a decrease was actually found. When in order to find an explanation of this phenomenon, the data were correlated, amongst other factors with body weight, it was obvious that the great majority of individuals who had not improved belonged to the normal and underweight groups.

Since, with respect to the underweight group particularly, the diets could hardly be said to have been of an undernutrition nature, the tentative conclusion drawn was that either the low

* The details of this investigation, the greater part of which are of no particular interest here, form the subject matter of a separate report.

carbohydrate or the high fat content of the diets was responsible for the decreased tolerance. In view of this observation, the diets of these patients were so altered as to relate carbohydrate content to body weight. Overweight diabetics were still given 50 grams of carbohydrate, and whether the remaining patients were given 75, 100, 125 or 150 grams depended upon the ratios of actual to expected body weights. (The expected body weights were taken from standard height-weight tables.) Subsequent blood sugar time curves showed that with the above mentioned alterations of diet alone, carbohydrate tolerance improved in the majority of cases. (It might here be observed that as a control the fat and protein contents of the diets were not altered).

The above results conform with the rather interesting observations reported recently by DuBois and his co-workers on two Arctic explorers.⁹ These explorers were normal persons; but because of exposure to abnormal diets (low carbohydrate) over a period of one year, their carbohydrate tolerance, as tested with 100 grams of glucose, corresponding to our blood sugar time curve, was found to be lowered. The curves showed a tendency to a sustained elevation in the level of the blood sugar.

These observations also conform with the present generally accepted view that, to maintain insulin production at a maximum, the individual must have a reasonable amount of sugar daily. Blood sugar time curves obtained with repeated rather than single doses of glucose are suggestive. These show that, after oral administration of glucose, when the concentration of sugar in the blood is falling, the ingestion of a second dose may result in little or no increase of blood sugars.^{10, 11} In other words, the ingestion of sugar stimulates the mechanism of its utilization.

Further suggestive are the recent observations of Soskin and Campbell,¹² which rather disturb our present conception regarding the metabolism of diabetes. These workers have shown that totally depancreatized animals, in which complete absence of islet tissue was subsequently verified by post-mortem examination, were able, in time, to retain increasing amounts of ingested sugar and the storage of sugar apparently corresponded to the phenomena observed in normal animals, as it was associated

with a definite lowering of the urinary nitrogen and diminished excretion of acetone bodies.

The final observations which led to the use of this new diet were Geyelin's experiences with human diabetes. It is his results which are really responsible for our immediate investigation of a large number of cases with this new diet. While in Montreal on a visit, Dr. Geyelin related to the writer some interesting experiences with high carbohydrate diets. The most striking was that of a girl, A. B., 14 years of age, who, in January, 1923, on a diet of 90 grams of carbohydrate, 125 grams of fat and 70 grams of protein, had glycosuria in spite of 39 units of insulin a day, and in July, 1929, on a diet of 300 grams of carbohydrate, 90 grams of fat and 80 grams of protein only 46 units were necessary to keep the urine free of sugar. During this period her body weight increased from 51 lbs. to 109 $\frac{3}{4}$ lbs., and her height from 4 feet, 2 inches to 5 feet, 5 inches. Before the new diet was instituted the blood cholesterol was 0.300 per cent; since then it has been as low as 0.110 per cent and has never been greater than 0.185 per cent. The urine has been sugar free since April, 1925.

An important variable to consider in the interpretation of the above results is that juvenile diabetes differs from the chronic progressive form in adults, in that carbohydrate tolerance may improve rapidly when the urines are kept free of sugar. A statistical demonstration of this fact was recently reported by the writer.¹³ Another point of special interest in this case is that the child was *not overfed*, the fat content of the diet having been reduced; the calories ranged between 1,800 and 2,300. Dr. Geyelin, however, tells me that this is a representative sample of the results of similar treatment of adults.

In view of the above experiences, an attempt was made to determine the effects of diets not only high with respect to their carbohydrate content, but of caloric values conforming to the principle of undernutrition. (The caloric values of our diets are definitely lower than those of Geyelin, in order to keep body weight slightly below average). The immediate results are rather striking and it is only to be hoped that, when continued over a period of

years, conditions will not change. The points of special interest are as follows:—

(a) The patients are satisfied. The diets, as stated before, eliminate the necessity of special articles of food (bran muffins, gelatines, etc.) which, when continued for a long period of time, become distasteful.

(b) Hyperglycemia and glycosuria are more readily controlled, whether the patients are or are not receiving insulin. The obvious conclusion from this is that insulin patients should be able to reduce the dosages, either in amount or frequency of administration. For the time being at least, this has been the usual course noted. Undernutrition is undoubtedly playing its part here. That it is not, however, the only factor, may be observed in cases where the diets have been changed with respect to the carbohydrate and fat contents, but the calorie values have been kept constant.

(c) As reduction of the dosage with insulin depends largely upon body weight, it is interesting to note that the diets are sufficiently attractive so that when given the option of being slightly underweight or of taking insulin, the majority of our patients select the former course.

With regard to instructions to the patient, these are very simple. The diets, as in the past, are constructed in terms of units, rather than weights. The great majority of our diabetics do not use and never have used scales.* In order to avoid their use, the quantities of food allowed are visualized with the aid of paper moulds, wooden blocks, etc. Thus, 30 grams, or an ounce, of bread represents one slice and is judged by a block of wood about $3\frac{1}{2}$ inches square and $\frac{1}{2}$ an inch thick. (It is obvious that with the different textures of bread, weights will vary, but if the above dimensions are adhered to, textures are such as to tend to give the individual rather less than more of the carbohydrate allowed). The quantities of butter, milk, meat, etc., are

* Anyone with an elementary knowledge of the theory of statistics will appreciate that owing to the marked variability of the composition of food materials, errors due to approximating, rather than weighing, foods have very little effect. The theory tells us that when an experiment involves two or more manipulations, each of which has its own error, the final error of the experiment is not equal to the sum of the individual errors, but to the square root of the sum of the squares of the individual errors.

also visualized by unit samples. For example, a 10 gram, or $\frac{1}{3}$ oz., portion of butter is shown by a block of wood 1 inch square and $\frac{1}{2}$ an inch thick.*

THE DIET

Fat.—The fat content must be kept low. The diets contain between 50 and 55 grams of fat only and if the patient adheres to the following simple rules this amount cannot be exceeded.

(a) One egg only is allowed at breakfast.

(b) Bacon, fatty meats and fish, and cream are forbidden.

(c) The amount of butter is confined to about 10 grams at each meal.

(d) One-half a glass (about 4 oz.) of milk is allowed at each meal.

(e) The total amount of meat or fish allowed for lunch or dinner is not more than 45 grams ($1\frac{1}{2}$ oz.) and it must be *very lean*.

Fruits and vegetables.—Fruits and vegetables, generally classed as 5, 10 and 15 per cent, are now included in one list for two reasons:— (a) the relatively small amount of carbohydrate in the fruits and vegetables compared to the total amount allowed in the diet; and (b) the results of recent analyses of these food materials.† The number containing 15 per cent or more of carbohydrate is so small that, if the rule of varying

* Sample paper and wood moulds, as well as forms for diet may be obtained from the author.

† Recently, it has been found¹⁴ that we have been over-estimating the carbohydrate content of fruits and vegetables. In the majority of cases, diabetic patients have been credited with the ingestion of more available carbohydrates than is justified according to new analyses, thus the following:

CONTAIN PRACTICALLY NO CARBOHYDRATE; Asparagus, celery, cranberries, cress, kale, lettuce, mustard and cress, radishes, rhubarb, ripe olives and watercress.

CONTAIN LESS THAN 5 PER CENT CARBOHYDRATE; Apples (fresh or stewed), artichokes, Barcelona nuts, bilberries, blackberries, black currants, Brazil nuts, broccoli, Brussels sprouts, cabbage, cauliflower, cherries (stewed), chicory, cocoanut, cucumber, damsons, French beans, gooseberries (stewed), greengages (stewed), leeks, lemons, loganberries, marrow, melon, pine kernels, plums (stewed), red currants, runner beans, ~~sea~~ kale, spinach, spring onions, strawberries, swedes, tomatoes, turnips and walnuts.

CONTAIN OVER 5 PER CENT AND LESS THAN 10 PER CENT CARBOHYDRATE; Almonds, apples (raw), apricots (dried or stewed), beetroots, carrots, cherries (raw), gooseberries (raw), grapefruit, greengages (raw), horse-radish, nectarines, onions, oranges, parsnips, pears, peaches (raw), plums, pineapple and pomegranate.

CONTAIN OVER 10 PER CENT AND LESS THAN 15 PER CENT CARBOHYDRATE; Green peas, peanuts and prunes.

CONTAIN OVER 15 PER CENT CARBOHYDRATE; Bananas, beans (baked), figs, haricots, potatoes and peas (dried).

the articles daily is followed, accidental ingestion of excess carbohydrates is avoided.

Bread.—The remaining part of the diet is bread and the amount the individual is allowed depends upon his caloric requirements. He may receive nine, ten, eleven, twelve or more slices of bread each day. Each slice of bread added to this diet increases it by approximately 18 grams of carbohydrate, 3 grams of protein, 0.5 of fat and 70 calories.

Bulk, if lacking, may be met with by the use of fruits and vegetables of practically no food value. (See list).

An interesting experience, unknown in the past with diabetics, is that, if the energy requirement is much greater than 1800 calories, the

diet may reach the point where the patients complain of too much bread! In this case, the different kinds of 20 per cent fruits and vegetables, such as bananas, potatoes and the breakfast cereals, etc., may be substituted for the bread.

The following form is a copy of the diet in detail as given to our patients. It will be noted that bread is the only variable article, the number of slices depending upon the caloric requirements. The possible substitutions are, also, shown. In addition to this list, each patient receives sample paper and wooden moulds of the various household measures, teaspoon, dessertspoon, cup, etc.

DIET

WARNING: The samples (paper and wood moulds) of quantities of food allowed must be carefully followed, in order to avoid the use of scales.

The following are the exact quantities of foods allowed at each meal. The use of any more bread or butter or the use of more meat or meat which is not very LEAN destroys the value of the diet.

BREAKFAST: One (1) orange, or one grapefruit, or one apple. (See sample size of each).
One egg.

slices (oz.) of bread. (See sample of one slice).

One portion (oz.) of butter. (See sample of one portion).

Tea or coffee

One-half glassful (4 oz.) of milk.

LUNCH: Clear broth of any kind. (Remove FAT).

One portion (1½ oz. of very LEAN meat or fish of any kind. (See sample).

Two portions (about 3 oz.) of vegetables from list allowed.

slices (oz.) of bread.

One portion of butter as at breakfast.

One portion (3 oz.) of fruit from list allowed.

Tea or coffee

One-half glassful of milk as at breakfast.

DINNER: Same as lunch, substituting the various meats, fish, vegetables and fruit and take
slices (oz.) of bread.

VEGETABLES

Globe artichoke, string beans, lettuce, cucumber, spinach, asparagus, endive, sauerkraut, beet greens, dandelions, swiss chard, celery, tomatoes, Brussel sprouts, watercress, cauliflower, cabbage, radishes, leeks, stewed rhubarb, green and yellow marrow, egg plant, pumpkin, turnips, onions, horse radish, beet root.

FRUIT

Olives, grapefruit, lemons, oranges, cranberries, strawberries, blackberries, peaches, pineapple, watermelon, stewed plums, raspberries, cherries, pears, apricots, prunes, apples, canteloupe, honeydew melon, blueberries.

CONSTANT USE OF ANY ONE FRUIT OR VEGETABLE SHOULD BE AVOIDED. VARY ARTICLES DAILY.

SUBSTITUTIONS

ANY ONE OF THE FOLLOWING MAY BE SUBSTITUTED FOR ONE (1) SLICE OF BREAD:—

Three (3) LEVEL dessertspoonsful (see sample) of UNCOOKED cream of wheat.

Three (3) LEVEL dessertspoonsful of any one of the following flours, UNCOOKED:— wheat barley, buckwheat, corn, cornmeal, oat, rice, rye.

Two (2) LEVEL dessertspoonsful of rice.

Four (4) HEAPING dessertspoonsful of oatmeal.

Two (2) HEAPING dessertspoonsful of dried beans.

Two (2) HEAPING dessertspoonsful of dried whole peas.

One (1) cupful of toasted corn flakes. (See sample size of cup).

One (1) banana. (See sample for size).

One (1) potato. " " " "

Five (5) soda biscuits. (See sample for size of each).

Four (4) teaspoonsful of orange marmalade.

Three (3) teaspoonsful of sugar.

ANY ONE OF THE FOLLOWING MAY BE SUBSTITUTED FOR ONE AND ONE-HALF SLICES OF BREAD:—

One (1) shredded wheat.

Macaroni, eight (8) strips, each strip being eight (8") inches long.

Cereals and flour are measured UNCOOKED, in order to be certain of uniform quantities. After measuring, they are prepared as usual, as the amounts of salt and water and time of cooking, etc., do not alter their food values.

With the above instructions and with the use of our units rather than the balance, the dietetic management of the diabetic becomes very simple. Although for the purposes of investigation we have so far confined our observations to individuals upon whom we felt we could rely, there appears to be no reason for encountering any great difficulties. The only possible danger, and that which we continually stress, is the temptation to use more butter with the large amounts of bread allowed. Of course, with the addition of extra fat in any form the diet becomes not only high in carbohydrates, but also high in calories. This would obviously lead to overfeeding and possibly to its dangerous sequelæ and would demand more insulin.

EFFECTS OF DIET ON BLOOD AND URINARY SUGAR

At the time of writing there are seventeen diabetics in the hospital. One of these patients may be reasonably excluded from this discussion. She is suffering from cholangitis and septicæmia and, in the attempt to conserve the liver, is receiving large quantities of glucose and insulin. With this one exception, all of these patients are on this new diet and all of the urines are free of sugar, except for very faint traces in three cases; none has acetone bodies. In eight of these cases the blood sugars are normal in the fasting state; mild grades of hyperglycæmia (blood sugars ranging between 0.121 and 0.180 per cent) are present in seven, and in two cases

only are the blood sugars above 0.200 per cent. Insulin is being made use of in nine cases.

From the above data, this question may be raised. Is it possible to explain these satisfactory results on the basis of mild diabetes? The answer to this may be found in Table I, in which are recorded the associated conditions and complications. It will be seen that there are no uncomplicated diabetics in this group. Because of the bed situation in this hospital, we avoid, as much as possible, admitting diabetics to the wards, unless the disease is severe or is associated with some other condition which requires treatment for itself. It will be noted that there is infection with suppuration in nine cases. These include four carbuncles, a compound fracture with infection, buttock, perinephritic and breast abscesses, and an acute mastoiditis. As is well known, probably no other condition interferes with the course of diabetes and tends to neutralize the action of the insulin more than infection with suppuration. In spite of this, however, the diabetes is under control in each case. As for the remaining group, if we include the cataracts, there are six cases of cardio-vascular disease. With these conditions, as is also known, individuals do not respond to insulin as readily as the uncomplicated severe diabetic.

Are these results due to the operation of the laws of chance? This, I believe, is highly improbable. This observation is based upon successive random sampling of groups of cases of similar numbers from our records. The following observations also support the idea of causal relationship, rather than accidental association.

EFFECTS OF DIET ON BLOOD CHOLESTEROL

The determination of the cholesterol content of the blood plasma is a routine procedure in all of our cases. We look upon high blood cholesterols as indicative of disturbance of fat metabolism and the higher the blood cholesterol, the greater the disturbance and, there-

TABLE I
Associated Conditions and Complications

Hosp. No.	
2227/30	Herniotomy (wound suppurating)
2374/30	Compound fracture with infection
3117/30	Carbuncle
3178/30	Carbuncle
3198/30	Cardio-vascular disease
3408/30	Abscess (perinephritic)
3477/30	Abscess (buttock)
3535/30	Gangrene
3682/30	Cholangitis
3841/30	Cataract
3870/30	Abscess (breast)
3892/30	Cerebral thrombosis
3916/30	Carbuncle
3978/30	Acute mastoiditis
3988/30	Cataract
3989/30	Carbuncle
4128/30	Gangrene

fore, the greater tendency towards complications, particularly acidosis. As infections, particularly those associated with suppuration, tend to interfere with the action of insulin, persons so affected also tend not only to have raised blood sugar but also raised cholesterol. In Table II are, therefore, given the cholesterol value of the nine cases with suppuration

TABLE II
Cholesterol Contents of Diabetic Blood Plasma in Cases of Infection with Suppuration

NEW DIET		
Hosp. No.	Condition	Cholesterol (per cent)
3978/30	Mastoiditis	0.119
3870/30	Mastitis	0.138
3117/30	Carbuncle	0.146
3916/30	Carbuncle	0.166
3989/30	Carbuncle	0.181
3477/30	Abscess (buttock)	0.107
3408/30	Abscess (perinephritis)	0.156
3178/30	Carbuncle	0.156
2374/30	Compound fracture	0.111
Average		0.142
OLD DIET		
Hosp. No.	Condition	Cholesterol (per cent)
5525/24	Carbuncle	0.208
3351/24	Carbuncle	0.222
992/25	Carbuncle	0.326
3213/25	Carbuncle	0.265
4559/26	Carbuncle	0.416
5699/26	Carbuncle	0.146
5696/27	Carbuncle	0.284
5841/29	Carbuncle	0.183
6585/29	Carbuncle	0.181
Average		0.248

previously referred to. For comparative purposes, nine other cases with suppuration (carbuncles) were selected at random from our records and their cholesterol data are recorded. It will be noted that, although normal plasma cholesterols were also associated with the older diets, in the majority of these cases, the values were high. The average plasma cholesterol of the nine cases selected at random from our records was 0.248 per cent, whereas with the new diet it is 0.142 per cent.

Parenthetically, it may be observed that the low blood cholesterol is the most striking feature of this diet. One cannot help being impressed with this fact as the dozens of analyses accumulate weekly. An observation of interest may here be made. On August 5th, Dr. Howard Root, of Joslin's clinic, visited our hospital. As Dr. Root has taken a special

interest in the blood cholesterol in diabetes, and in order to demonstrate the effects of the new diet, 16 cholesterol determinations were made on that day. The following were the results:—

Case No.	Plasma cholesterol (per cent)
1	0.157
2	0.132
3	0.222
4	0.151
5	0.185
6	0.190
7	0.189
8	0.179
9	0.169
10	0.099
11	0.159
12	0.098
13	0.208
14	0.196
15	0.137
16	0.169

Incidentally, the insulin dosage required in our hospital cases has been lower than for similar types of cases met with previously. With infection and suppuration 60, 80 and even 100 units daily have been found necessary, and, at times with control of acetoneuria only, glycosuria persisted. One must hesitate to stress this observation, in view of the large number of variables which may influence insulin dosage. Some of these variables are not recognizable, while others may be recognized, but not controllable. The facts are mentioned merely in order to suggest further study of this phenomenon in the future.

It so happens that of all of the above mentioned hospital cases, three only were our own patients prior to their admission. We, therefore, have no accurate control by which to judge progress, that is, no index of their metabolism prior to their new diets. That the above data, however, are the result more of causal relationship than accidental association is further suggested from the data in Table III obtained from patients treated with insulin who have been in our clinic for some time. Their metabolism was known prior to the dietary changes made recently.

A uniform procedure was adopted in the study of these cases. Blood and urinary sugar were estimated before the new diet was instituted. Slight reductions of insulin dosage were then made, followed, again, by blood and urinary sugar analyses, in order to eliminate the possible effects of excess quantities of insulin. The new diets were then given.

TABLE III.

No.	Old Diet								New Diet							
	Diet				Insulin (units)	Urine sugar	Blood		Diet				Insulin (units)	Urine sugar	Blood	
	C.	F.	P.	Cal.			Sugar	Choles- terol	C.	F.	P.	Cal.			Sugar	Choles- terol
227/30	125	140	60	2000	10	0	0.153	0.208	236	56	72	1736	5	0	0.192	0.187
6037/29	125	140	60	2000	50	0	0.200	0.272	236	56	72	1736	40	0	0.158	0.151
5158/25	50	150	50	1750	40	0	0.222	0.370	200	56	66	1568	40	0	0.147	0.200
3954/24	50	150	50	1750	20	0	0.111	0.252	218	56	69	1652	10	0	0.122	0.244
5135/21	85	150	50	1890	40	0	0.166	0.287	218	56	69	1652	30	0	0.172	0.225
5053/28	100	140	50	1860	50	0	0.181	0.277	236	56	72	1736	40	0	0.174	0.151
1269/30	125	140	60	2000	30	0	0.129	0.138	236	56	72	1736	10	0	0.117	0.211
241/27	85	150	50	1890	50	0	0.126	0.333	218	56	69	1652	30	0	0.115	0.212
3388/27	50	150	50	1750	35	0	0.166	0.263	236	56	72	1736	40	0	0.153	0.111
2044/26	50	150	50	1750	20	tr.	0.244	0.378	236	56	72	1736	20	0	0.227	0.196

It will be observed that with the replacement of the old diets by those of slightly less caloric value but of much higher carbohydrate and much less fat content, the diabetes was controlled with the use of less insulin in seven cases. In one case only was the dose increased (No. 3387/27).

Of all the data in Table III, the blood and urine sugars are regarded as the most significant. It is generally recognized that it is possible to alter the diet of a diabetic and affect the disease adversely without alteration of the clinical picture for some time; depending upon the severity of the disease, the clinical picture may not change for weeks, months, and, in isolated cases, years. The cholesterol values may also not be affected for some time. With regard to blood sugar, however, the course is entirely different. Following a diet which affects the course of the diabetes adversely, the appearance of hyperglycemia may not only be a matter of days, but of hours. In addition to the above mentioned cases, we now have 41 other diabetics whose metabolism is known. The disease in these cases is relatively mild, as the patients require no insulin to maintain normal blood sugars and urines free of sugar. Briefly, it may here be observed, that in none of these cases when diets of 200 to 236 grams of carbohydrate, 56 grams of fat, and 66 to 72 grams of protein were substituted for their older diets of approximately 50 grams of carbohydrate, 150 grams of fat, and 50 grams of protein, do the most recent blood and urinary analyses show unfavourable progress.

It is interesting here to note that in a number of cases there was an early and temporary dis-

turbance of the blood sugar with the change in diet. This fits in with the generally recognized experiences that once the dietary habits of the diabetic have been altered the disease is not so readily controlled by new dietary changes as when diets are given in untreated cases.

In this group, also, one of the most characteristic findings is the lowering of the blood cholesterol. Whether this is due to the low fat, high carbohydrate, or low caloric factor is at the present time difficult to estimate. In the interpretation of these data one must, also, consider the fact that only one egg a day is allowed in this diet. Eggs are exceptionally high in cholesterol. (One egg contains approximately 0.40 grams of cholesterol).

NITROGEN AND RESPIRATORY METABOLISM

A characteristic metabolic feature of this new diet is nitrogen retention in the early stages. The explanation of this is not quite clear. It is suggested that it is probably due to the difficulty with which diabetics are kept in nitrogen equilibrium when on relatively high fat and low carbohydrate diets. This difficulty was first noted by Geyelin and DuBois.¹⁵ Lyall³ suggests that the attainment of nitrogen equilibrium depends upon the varying degree of ability to utilize glucose. If only a minimum quantity of sugar can be utilized the patient is thrown back on endogenous protein and fat as a source of energy. It is, therefore, suggested that this observation applies to older diabetic diets, such as our diet of 50 grams of carbohydrate, 150 grams of fat, and 50 grams of protein, since, with such diets, though the

diabetics could probably utilize a greater amount of carbohydrate they did not receive it.

The respiratory metabolism data are also of interest. A rather peculiar finding in the diabetics treated with insulin, and one repeatedly observed, was a respiratory quotient above unity within a short time after each dose of insulin, accompanied by an increased metabolism. Without the increase of metabolism, the probable explanation would be conversion of sugar to fat. If this process is natural it would appear to be uneconomical, particularly with regard to the hibernating animal. Professor Lusk, however, when shown the data, suggested that it is not quite clear that the storage of carbohydrates takes place without specific dynamic action. The respiratory metabolism data when performed daily also showed a gradual increase of the quotient in the fasting state, suggesting an increased storage of carbohydrates.

These are a few observations which may here be referred to briefly with regard to the metabolic data. The latter, in detail, form the subject matter of a separate report. The purpose of the present communication is merely to record our experiences with this new diet. They clearly demonstrate that, at least for a short time, it is possible to replace the older diets of relatively high fat-low carbohydrate with diets of high carbohydrate content and of practically iso-caloric value, not only with no disturbance of carbohydrate metabolism but apparently with improvement. This applies whether the individuals do or do not require insulin. Further experiences are, obviously, necessary in order to determine the permanency of the effects of these diets. The blood sugar, however, which is the most sensitive index of altered carbohydrate metabolism, affords much encouragement and the primary purpose of this communication is to prompt others with similarly available material to test the diet.

It must here be stressed that this diet is an undernutrition one, except that the term "undernutrition" is used in a somewhat different sense than it was prior to the advent of insulin. Before insulin, undernutrition, the

only successful method of keeping severe diabetics alive, meant keeping them on diets incompatible with comfort and food requirements for ordinary duties. The term undernutrition, as used in this report, means keeping diabetics slightly under rather than over weight, but compatible with comfort and daily duties. Individuals are kept 5 to 10 lbs. under their average body weight. It has, however, been our experience, at least so far, as stated above, that when individuals are given the option of being 10 lbs., underweight or of taking insulin, they invariably choose the former course.

In this work I am gratefully indebted to the Chiefs of the various Services of this hospital. It is because of their coöperation that the entire material of this hospital is, and always has been, available for investigation purposes by this department and affords the accumulation of large amounts of experience in very short periods of time. Acknowledgement is, also, due our dietitians, Miss Ruth Parke and her assistant, Miss Gwendolyn Taylor, for their very valuable assistance. Appreciation is due Mr. Julian C. Smith, of Montreal, and a Governor of this hospital, for his continued interest and financial assistance in the work of this department.

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BACILLUS COLI INFECTIONS*

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EVERY clinician who works with children must be well acquainted with *Bacillus coli* infections of the urinary tract because the condition is a common one, especially during the earlier years; but as pyelitis can only be diagnosed with certainty by an examination of the urine it is difficult to form any estimate of the exact frequency of such infections. The symptoms are often misleading, so that the urine is not examined, and in less severe cases the diagnosis must be missed many times for each occasion on which it is correctly made. The unwary and the inexperienced, who have not pyelitis in mind, and who neglect to examine the urine of small children, must fail to identify the infection. Even the watchful and experienced do not always find the diagnosis easy, for the collection of a satisfactory specimen of urine may take days even under the best conditions in hospital. In dealing with girls a catheter specimen is essential, since there is a great risk of contamination of the urine passed naturally; the difficulty of collecting a sample of the urine of male babies is less, but may require both skill and patience. What is difficult in hospital is but seldom attempted in general practice, and here it is quite exceptional to find that the urine of a small child has been examined.

The typical urine is pale and opalescent, the appearance being unaltered by the addition of acid or alkali; there is at least a trace of albumin present, and under the microscope pus and *B. coli* are seen. But there may be no such gross bacilluria as to produce opalescence, and the quantity of pus may not be great, so that to naked-eye examination the urine appears normal. In such cases a correct diagnosis can only be made by a careful microscopic examination. It is hardly necessary to add that a cul-

ture of a fresh specimen of urine is always advisable.

During recent years the whole subject of urinary infections has been invested with a new interest since Chown³ and others, working from the pathological side, raised important questions in the etiology and pathology of the condition. These questions are of more than academic interest, for, if the pathologists are correct, the clinician must revise his ideas of both etiology and pathology, and will probably have to modify his prognosis and treatment.

CLINICAL ASPECT

This infection may occur as early as the first week of life; indeed some cases have recently been labelled congenital. It becomes more common at a later date, and only begins to diminish in frequency after about the eighth year. In the earliest cases, boys and girls seem to be almost equally affected, but at the age of one year the girls already outnumber the boys, and as the years pass the preponderance of girls increases. These facts are pretty well established clinically, although the more recently published figures suggest that the incidence among boys is not so much less than among girls. Authors differ considerably in their estimates of sex incidence.

The figures from the Birmingham Children's Hospital are as follows: Under 2 years, 47 cases; boys 7 (17.5 per cent), girls 40 (82.5 per cent), deaths 7 (all girls). From 2 to 12 years, 70 cases; boys 18 (25.7 per cent), girls 52 (74.3 per cent), deaths 2. These figures deal with the diagnosed cases—probably the more severe cases which needed hospital treatment; even in these more severe cases the mortality is only 9 in 117, or 7.7 per cent.

Chown has made interesting suggestions to explain the disproportionate number of girls. He says that the diagnosis of pyelitis, and its

* Read at the ninety-eighth annual meeting of the British Medical Association, Winnipeg, August, 1930, in the Section of Diseases of Children.

inherent suggestion of an ascending infection, renders girls more often suspect, so that their urine is more often examined than that of boys in whom the condition is not expected. Further, since a girl's urine is liable to contamination from infections of the vulva, etc., a number of spurious cases of pyelitis are added to the real ones, and so the number of cases occurring among girls increases, while in boys whose urine is unexamined the condition is missed. It is hardly likely that such mistakes can have affected my figures much, because the staff of a children's hospital are alive to the fallacies as well as to the facts of urine examination in children, and the urines to be examined are almost invariably catheter specimens, at least in girls.

SYMPTOMS

Cases may be classified as acute, subacute, or chronic. The acute case often commences with a rigor, or convulsions, and high fever, and general disturbance which may be so severe as to suggest meningitis or pneumonia; the child is obviously ill. Sometimes vomiting or gastrointestinal disturbance is a marked feature. In slightly less abrupt cases headache, backache, and general illness may suggest a typhoid or some similar infection. These acute symptoms are relatively common in the younger children and make the diagnosis particularly difficult and uncertain until the urine has been examined.

In older children the symptoms of pyelitis tend to be less puzzling, and constitutional disturbance is generally less severe. An abrupt onset is still common, but in the majority of these cases there is some local symptom, such as tenderness in the loin, frequency of micturition, or some discomfort in passing urine to point to the correct diagnosis. Still many cases are obscure at the onset, and, where vomiting is a feature, the child may present the picture of a profound acidosis when first seen. At times an increased respiration rate may suggest pneumonia. Malnutrition and anaemia may set in rapidly, and occasionally jaundice complicates the diagnosis. Malaise, rather vague aches and pains, and moderate fever may suggest rheumatism, or abdominal discomfort and tenderness may lead to a mistaken diagnosis of appendicitis or abdominal tuberculosis. Indeed, there is

scarcely any mistake which cannot be made in regard to these children.

Many of the chronic cases show surprisingly little constitutional disturbance. The patients are, perhaps, restless, imperfectly nourished children, who tend to be nervous; but they are brought up for consultation on account of symptoms apparently wholly unconnected with the urinary tract, so that as a rule it is only during the search for the cause of their troubles that the infection is discovered. Fever may be absent or very slight in such children, and apart from the general lassitude and malaise, with anorexia and some pallor, there are no definite symptoms. The subacute cases generally occur among children who show periodic exacerbations of a latent infection, recurrent upsets which may appear with attacks of vomiting simulating cyclical vomiting, or periodic bouts of fever, the cause of which remains obscure until pus and *B coli* are found in the urine.

TREATMENT

The general rule is that patients having acute symptoms do well at all ages under strict treatment, but a certain number of those affected either fail to respond at all or only respond moderately well and gradually fall into the subacute or chronic groups. In the less acute groups the cure is much more difficult, and treatment has to be more prolonged. In some instances the most painstaking treatment seems to be utterly unavailing, and nothing has the slightest effect upon the urine, for the bacilluria persists unchanged in spite of every form of therapy. Some cases show evidence of renal damage, such as the presence of casts in the urinary deposit, a raised blood urea, or a poor urea concentration test. In such cases the prognosis is not at all good, for sooner or later they develop signs of renal inadequacy or cardio-vascular damage.

There seem to be three important requisites in the successful treatment of all cases. Needless to say the earlier the diagnosis is made and correct treatment commenced the better the outlook. The first requisite is rest in bed until the condition of the urine is normal. Children generally relapse if allowed to get up and run about before bacilli are completely abolished from the urine. They may relapse after the urine has become normal, but are certainly less

likely to do so if kept at rest until the urine is free from bacteria. The second requisite is alkali; this should be given in plentiful doses as sodium bicarbonate or potassium citrate. These drugs are not palatable, and should be made at least tolerable by the addition of syrup and some flavouring agent. The bicarbonate may also be added to drinks, and the citrate given in moderate quantity in home-made lemonade is not objectionable. No degree of alkalization can completely inhibit the growth of *B. coli* in the urine, since the organism will grow in a more alkaline urine than the kidney can excrete. Wright states that *B. coli* grow in urine of pH 9.0 and the most alkaline urine the kidney can excrete has a pH of 8.6. For some years I have been in the habit of maintaining a constantly varying pH of the urine by alternating alkaline and acid medication. The alkalis are given in as large doses as the child will tolerate until the urine is definitely alkaline; then a mixture containing hexamine and acid sodium phosphate is used until the urine becomes acid, at which point alkalis are again exhibited. This treatment has the advantage not only of discouraging the colon bacillus, but also of diminishing other urinary organisms. I do not place any great faith in hexamine, but prolonged usage has given it some reputation and it seldom does harm. The third point in treatment is the flushing of the kidney by a large fluid intake. Fortunately most of the small patients are eager to drink, and this readiness should be used to give as large a quantity of fluid as possible; even a small child should take fifty to sixty ounces of fluid a day, and more can sometimes be given. Various urinary antiseptics are recommended; hexamine, salol, or hexyl-resorcinol are those most commonly taken by the mouth, while the usual lengthy list of antiseptics may be tried locally. Good results seldom follow such measures. Vaccines occasionally seem to be useful but far more often prove disappointing.

The chronic case and the recurrent case present special difficulties in treatment, and it is still an open question how far one ought to go in attempting to eradicate the infection. McKann¹⁴ points out that 20 per cent of children with chronic pyuria show some abnormality of the urinary tract. The most com-

mon deviations from the normal are dilatation of the ureters or kidney pelves, kinking or doubling of the ureter on one or both sides. He suggests that these abnormalities have a special relationship to urinary infection, such that the abnormality either predisposes the tract to infection, or that a fortuitous infection persists because of the abnormality. Bigler,¹ in 153 consecutive post-mortem examinations of children in which particular attention was paid to the urinary tract, found no less than 13 per cent of abnormalities. Curiously enough the commonest abnormality was ureteral narrowing or obstruction, which occurred in 11 cases. In this series of 20 cases only 4 patients died as a result of urinary tract infection, and as the eldest of these was only 6 weeks old congenital abnormalities can hardly be said to have played a large part in predisposing to urinary infection in this series. On the other hand, there is no definite evidence here for or against the suggestion that abnormalities favour the persistence of acquired infections. In the present state of our knowledge, then, it is essential that every effort should be made to discover any abnormality of the urinary tract in any case of chronic or subacute pyelitis, in order that it may be corrected if possible or the prognosis modified accordingly.

A child with recurring attacks of pyuria who has a double dilated ureter and kidney pelvis can only be regarded as most seriously ill. On the other hand, a single hydronephrosis with a double ureter, provided that the sound kidney is functioning normally, can be treated surgically with a reasonably good hope of a definite cure. It is therefore advisable to have a cystogram taken in all chronic cases, and to make a cystoscopic examination in such as are unsatisfactory or doubtful as well as in the definitely abnormal. Pyuria is often associated with bowel infections and occasionally with a chronically inflamed appendix. These conditions should receive appropriate treatment.

PATHOLOGY

Interesting pathological studies have been published by Chown and by Wilson and Schloss,¹⁹ their papers being the result of post-mortem examination of children with urinary tract infections. Chown's paper was based on material collected at Johns Hopkins Hospital

for the years 1911 to 1924, and deals with 29 cases. Wilson and Schloss took twelve years to collect the 49 cases on which they base their paper. These details are of some importance, since we are not told the number of clinical cases which produced the pathological material. The conclusions reached in both papers are similar, namely, that pyelitis is a misnomer; that pyuria is due to an interstitial suppurative nephritis, and that careful examination of the kidney pelvis generally fails to show any evidence of pyelitis.

The types of cases studied by these authors are identical, and are instances of severe septicæmic conditions. In Wilson and Schloss's paper there are no fewer than 7 cases of meningitis; 14 of pneumonia, 3 with empyema, 2 with otitis media; 11 of acute infective enteritis; and many of the cases combine one or more of the above conditions. These cases are obviously general blood infections of the most severe nature. It is doubtful if the *B. coli* which appeared in the urine was the original invading organism, and indeed it seems probable that this organism was a secondary invader if it ever reached the blood stream. The same may be said of those somewhat uncommon and most curious cases of pyelitis associated with jaundice reported by Gorter and Lignac.⁸

Helmholz has done some extremely interesting experimental work with rabbits. He finds that spontaneous *B. coli* infection of the urinary tract occurs in these animals; that the bladder is primarily infected, and hence there may be an extension of the infection, producing a pyelitis or pyelonephritis. On the other hand, if colon bacilli are injected into the blood an entirely different pathological picture appears, for under these conditions kidney abscesses may result, the bacilli being found equally distributed through both ureters and the bladder. He finds that the bladder is never infected unless the ureters are infected; the ureters are never free from *B. coli* if the bladder is infected. In the spontaneous infections, by tying off the bladder and ureters separately, Helmholz has shown that the bladder is often infected, while one or both ureters are free from infection, and that although pyelitis and pyelonephritis may appear, kidney abscesses do not occur in the spontaneous infection.

It seems worth while to turn from the consideration of children to review briefly *B. coli* urinary infections in adults. After puberty such infections are far less common than in childhood, and a marked disproportion exists between the sexes. In men, apart from calculus, prostatic abnormalities, and urethral stricture, *B. coli* infections of the bladder or ureters are rare. In women, on the other hand, infection with *B. coli* is by no means uncommon. The associated conditions are pregnancy, gynaecological operations, the trauma of the honeymoon, and long periods of retention such as may occur on long car or railway journeys.

Further, such infections—provided that the infecting organism is the *B. coli* only—produce but little upset, and are probably frequently missed. The facts of this brief statement seem to point very definitely to an ascending rather than to a blood infection, and support the clinical finding of children's physicians that pyelitis is generally an ascending infection with a correspondingly greater incidence in girls. If these infections (*B. coli*) were bloodborne then men would be not less susceptible than women, and evidence of disturbance in other organs of the body would be common and not infrequently severe.

Certain figures have been obtained from the Children's Hospital in Birmingham. Starting from the year 1925, 117 consecutive and unselected cases of pyelitis were taken with the object of tracing the children, re-examining them, and determining as far as possible their present condition. In this way it is hoped to throw some light on the etiology of the condition.

Age	No.	Male	Female	Average age, years	Acute cases	Died
0 to 2 years	47	7	40	1½	33	7
2 to 12 years	70	18	52	6½	31	2

The average age among boys was 7½ years.

Of the seven deaths that occurred during the first two years all were in girls. Three were cases of pyelonephritis; one had kidney abscesses; one pneumococcal septicæmia; one infection of a congenital hydronephrosis; and one pyelonephritis and thrombosis of the left renal vein. This death rate (9 in 117 cases) is 7.7

per cent, or 3 per cent in cases of over 2 years of age. It must be remembered that these figures are taken from those cases ill enough to be admitted to a hospital, which suggests that many milder cases occur which do not need admission, and that therefore this is a higher death rate than the real mortality of all cases of pyelitis. On the other hand, several of the chronic cases showed evidence of nephritis while in hospital—the presence of tube casts in the urine, raised blood urea, or a poor urea concentration capacity. The cases in the above series are being followed up to determine the present condition of the children. It is proposed to examine the urine, the renal function, and the cardiovascular systems.

CONCLUSIONS

As a clinician I am familiar with a *B. coli* infection of the urine, a condition which is frequent in children, commoner in girls than in boys, appearing in acute, chronic, and recurrent forms, but which is relatively seldom fatal. This condition has been called pyelitis, and although I am not in a position to prove that it is always a pyelitis, I feel that I can prove that it is not always part of a septicaemia or evidence of a nephritis.

It seems that the pathologist has experience only of a selected group of patients out of the many who have *B. coli* infections of the urinary tract—the more severe cases which are septicaemias, and in which the colon bacillus is seldom if ever the primary infecting organism. It is hardly likely that a severe septicaemic condition in children, with renal infection and possibly abscess formation, could have a mortality as low as 3 per cent after the age of 2, and it is significant that the collection of 78 post-mortem records took no less than twelve years at two large children's hospitals, whereas clinically *B. coli* infections are common.

I am deeply indebted to Dr. A. V. Neale for the work he has done in following up cases and in getting out the original figures for cases of pyelitis at the Children's Hospital, Birmingham.

DISCUSSION

DR. D. NABARRO (London), speaking as a pathologist, said that there was little direct evidence that the infection was primarily one of the renal pelvis. *B. Coli* was the commonest organism associated with pyelitis of infancy and childhood, and it was an interesting coincidence that Escherich who discovered the *B. Coli communis* is generally credited with having introduced the concept "pyelitis" into pediatrics. Finkelstein regarded the lesion in

infants as a primary pyelitis, but this view has been challenged in recent years and various observers now believe that the condition is primarily an interstitial nephritis.

The *Bacillus coli* was a harmless saprophyte in the bowel, though even there it had been credited with a pathogenic rôle. It had pathogenic properties in other organs. He did not believe that cultural characters of organisms became fixed but that they might vary with circumstance and environment. Different strains of *B. coli* had been found, some hæmolytic, others non-hæmolytic. The urine should be repeatedly examined to see whether the same organism was present; he had found as many as five varieties at different times in one case. He raised the question as to whether *B. coli* was a primary cause or merely a secondary invader. With regard to the route of infection, Dr. Nabarro had prepared a number of blood cultures in these cases and they had all been negative. He emphasized the proportion of cases in which *B. coli* pyuria was secondary to congenital or acquired abnormalities of the urinary tract, and described some cases due to hydronephrosis, and ureteric and bladder hypertrophy, with valve-like folds in the ureter. It had been found that 2.5 per cent of all post-mortems on children showed some congenital abnormality in the urinary passages. He showed pictures of specimens illustrating these abnormalities.

Dr. Nabarro laid emphasis on the importance of investigating these cases as early as possible from all points of view by a team consisting of physician, surgeon, bacteriologist, biochemist, radiologist and pathologist.

DR. BRUCE CHOWN (Winnipeg) in his remarks, dealt especially with the pyuria of infants under two years of age, as most of his work had been on these cases. He did not think that there had ever been proof that a pure pyelitis occurred in infants, nor was there often any post-mortem evidence of pyelitis even where the kidney was much diseased. He had found a suppurative interstitial nephritis in most of his fatal cases, and others had reported the same. At the earliest ages boys were affected only slightly less frequently than girls, though in older children girls were more commonly affected. He believed the infection to be hæmatogenous in origin, though he admitted the possibility of a lower urinary tract infection occurring in some cases. It must be borne in mind that the sex incidence and the route of infection were inseparable subjects, and that at present we were not in a position to state the exact sex incidence. One point in favour of the presence of nephritis, even in the milder cases, was the comparative frequency of pus casts in the urine. Dr. Chown pointed out the interesting fact that young calves who are too early deprived of the colostrum of their mother's milk frequently develop a *B. coli* infection of the kidneys. This might have some practical bearing on the colostrum intake of young babies and the incidence of suppurative pyelo-nephritis.

DR. R. R. STRUTHERS (Montreal) said that he had found pyuria very rare in male infants and he had had no deaths from this cause. In chronic cases he had investigated for congenital abnormalities and had often found that a cure could be brought about by surgical treatment.

DR. HELMBOLT (Rochester, Minnesota) agreed with Chown, Wilson and Schloss that post-mortems on these cases usually showed a lesion of the kidney, but was not convinced that such lesions were due to the *Bacillus coli*. Experiments which he had performed on animals showed that while the blood-borne streptococcus and staphylococcus tended to localize particularly in the kidney, the *Bacillus coli* very rarely did so. This fact was against the theory of blood infection in children. It had been denied that any pelvic inflammation existed in post-mortem cases, but he pointed out that the kidney pelvis was not easy to examine microscopically; numerous sections would be necessary to disclose its pathology, and in his opinion the pelvic lining was destroyed very rapidly after death. He had found definite inflammation when the post-mortem was performed within two or three hours of death. Pelvic inflammation was also found to heal very rapidly in experimental animals. On the

whole, he was inclined to believe that the infection was only haematogenous in the new-born, but that after the first few weeks of life it was an ascending infection. He did not, however, deny that kidney lesions might be present, even in the milder cases. The disease was frequently associated with gastro-enteritis and was there commoner in girls than boys. He had pursued much the same lines of treatment as Dr. Wilkinson. Experiments had shown that if *B. coli* were grown in broth and rapidly transferred to acid broth, the germs almost ceased to multiply.

He had had good results from treatment by urotropin (hexamine) in 0.5 gram doses, and generally used ammonium chloride and ammonium nitrate to acidify the urine up to a pH of 5 to 5.5. He thought that urotropin ought to be pushed to the point of bladder irritation. Haematuria, when it occurred, came from the bladder. If there was no improvement within three weeks, he thought then all cases should be examined for congenital abnormalities.

Dr. H. C. CAMERON (London), said that one must be careful not to jump to the conclusion that a case of pyuria was necessarily a primary urinary infection. The condition was often a complication of other infections, such as meningitis. He pointed out also the difference between the clinical course and the bacterial course of the disease; the former was often short, while the latter persisted for a long time.

THE PRESIDENT, Dr. ROBERT HUTCHISON (London) taking a wide view, observed that more might be known on the question if one could explain the incidence of the disease in adults, solve the question as to why *B. coli* pyelitis should be so common in pregnant women and why it should occur especially on the right side. He suggested that a lateral infection should be considered as well as an ascending or descending infection. Many cases had been associated with a diseased appendix. He thought that an important part of the treatment was to raise the general standard of vitality. Diet was also

important; he believed that cases improved if the amount of milk in the diet was cut down.

Dr. WILKINSON replied, and showed an x-ray picture of enlarged kidney, probably congenital cystic disease, in which there had been a secondary *B. coli* infection.

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PHARMACOLOGY AND MEDICAL SCHOOLS.—Charles W. Edmunds reviews the status of pharmacology in the curriculum of the medical school and its influence on the practice of medicine. He says:—Imagine a physician with a training covering four years, such as is given in a modern medical school, followed by one or two years' internship, receiving a letter from a pharmaceutical firm telling him that "he should refer his medical problems to them." Who are the members of the staff of the firm who shall settle the problems of the physician for him? How reliable and how unbiased will be the therapeutic advice which he will receive? Such a letter is an insult to the profession, but physicians are so used to them that they fail to arouse even a mild state of irritation. The Council on Pharmacy and Chemistry tries to insure that the advertising matter of its accepted products shall contain no incorrect or false information; but who act as critics of the great mass of medical advertising literature which daily floods the mail? And yet it is from such sources that the average physician takes his graduate training in therapeutics. If perchance he is a visiting physician in a hospital or a teacher of medical students, he hands on this commercial therapeutic misinformation, with the result indicated in the state board comments which have been quoted. Another effect of this flood of advertising matter which daily clutters the physician's mail, and an effect which is largely overlooked, is the influence which it has on the physician himself. He is trying to the best of his ability to practice scientific medicine and he wants to employ the best and most reliable remedies obtain-

able. He must therefore try to appraise the value of these remedies by daily experience with them in his practice; but even before he has learned the advantages or drawbacks of one of the hypnotics, let us say, along comes a circular describing another with a different side chain which, it is claimed in a loud tone, gives the compound greatly increased efficiency with lessened toxicity and absence of side effects. What is the physician to do? He must keep abreast of the times, so at the expense of his own independence and of his scientific training he must use the new compound. After all, the pharmacologist cannot be held responsible for instruction in practical therapeutics. In only rare instances does he have access to the clinic. The internists, then, whether they will or no, must give such training. If the practical therapeutic knowledge of recent graduates is limited to proprietary preparations, his clinical teachers are responsible. Their methods of practice are reflected in their students. "By their fruits ye shall know them." And yet it is absurd to say, as was said recently, that the pharmacologists are not "especially concerned with the immediate or practical application of their results." Pharmacology, standing as it does midway between the preclinical medical sciences and the clinical subjects, occupies a unique position. Besides furnishing its own special contribution to scientific practice, it helps to bridge the gap between the normal and the pathological, frequently aiding in an understanding of the latter, and it may furnish the rational basis for the remedial agents, as it has so often done before.—*J. Am. M. Ass.* 95: Aug. 9, 1930.

ANÆSTHESIA FOR OPERATIONS UPON THE GRAVID UTERUS*

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MUCH of the value of this great meeting of doctors from all parts of the English-speaking countries of the world must lie in the opportunity which is afforded for us to understand the point of view from which each of us regards his work. We read of new methods as they are reported in the medical journals, and we try them out, or else perhaps we disregard them as unattractive. Often a new method is extolled far beyond its actual merits, and, in the consequent reaction, it may fall into complete disuse. Or, perhaps, we find a satisfactory method and we fall into the habit of employing it as a routine, with the result that in a certain case we may neglect a procedure which would be more helpful for that particular patient's operation, diathesis, disease, or mental attitude. It is the intention of this paper to show how, by a wise selection of methods, the anæsthetist may collaborate with the obstetric surgeon to make his work more effective and the safety of the patient more secure.

PRELIMINARY CONSIDERATIONS

During pregnancy, women tolerate anæsthetic drugs exceedingly well. Last year, at the Birmingham Maternity Hospital, nitrous oxide was administered to more than three hundred women for dental extractions, at all stages of pregnancy, and there was not a single miscarriage. Ether, chloroform, gas-oxygen, and spinal anæsthetics are often administered for all kinds of surgical procedures, but, save in the presence of dangerous infections, such as peritonitis, it is rare for the pregnancy to be interfered with.

Operations on the uterus and its appendages, when in the gravid state, fall into three groups: Group 1, operations only on the uterus and its

appendages; Group 2, operations on the uterine contents; Group 3, operations on the gravid uterus together with its contents.

OPERATIONS ONLY ON THE UTERUS AND ITS APPENDAGES

These operations are usually undertaken with the purpose of improving the course of the pregnancy, or of making normal and unobstructed labour possible. Thus it may be necessary in the earlier months of pregnancy to replace a retroverted gravid uterus. Inasmuch as muscular relaxation of the abdominal wall is necessary, and cyanosis is not advisable, ether preceeded by atropine is more satisfactory than gas or gas-oxygen.

Fibroid tumours, particularly those in the cervix, and simple ovarian cysts may obstruct the pelvic cavity. Removal of these tumours is often a matter of considerable operative difficulty. The aims of the anæsthetist are, therefore, abdominal relaxation, avoidance of circulatory congestion and oozing from cyanosis, and the least possible disturbance of the kidney and liver functions. Perhaps the best compromise is obtained with chloroform, or a mixture of chloroform with ether. Gas-oxygen does not give sufficient relaxation and the resulting tension and pressure on the uterus may produce an intra-uterine hæmatoma, resulting in a miscarriage. Spinal analgesia is useful because it controls the bleeding. Mr. Lewis Graham, of Birmingham, has kindly permitted me to quote a series of six operations for myomectomy which were performed under chloroform and ether mixture. There was no untoward event. In one of these cases, the fibroid was as large as a cocoanut and deeply embedded. After removal, the base of the placenta could be seen at the bottom of the wound in the uterine wall, but the pregnancy continued normally. By way of contrast, however, I may refer to a case, at the sixth month of gestation, in which an adherent degenerating fibroid was removed under ether

* The opening paper in a discussion of the subject held on August 27, 1930, at the ninety-eighth annual meeting of the British Medical Association, Winnipeg, Section of Anæsthesia.

with very great difficulty. Next day the woman miscarried.

Accidents to ovarian tumours, such as rotation or infection, may render the patient acutely ill, and, in these cases, the anaesthetist must help the surgeon to save the patient's life regardless of the pregnancy. Gas-oxygen is a very suitable agent, because anaesthetic toxæmia and post-operative collapse are reduced to the minimum. Indeed, relaxation in these conditions is obtained with comparative ease.

Ruptured ectopic gestation is usually best dealt with under gas and oxygen. But in a case of ruptured tubal gestation which was complicated by severe bronchopneumonia, a spinal anaesthetic was employed with a satisfactory result.

OPERATIONS ON THE UTERINE CONTENTS

Here, although in the course of the operation the uterus may be incised or manipulated, the surgeon endeavours to effect his purpose on the contents of the uterus without producing any permanent injury or alteration in the condition of the uterus and tubes. Thus, taking this group on a wide scale, we have to consider anaesthesia for:— (a) manipulation of the fetus in utero, to obtain good position and satisfactory presentation before labour; (b) normal labour and labour complicated by protraction, manipulation, instrumentation, and so forth; (c) emptying of the uterus by direct operation, including evacuation of the premature fetus or mole, and Cæsarean section for the viable fetus.

MANIPULATION OF THE FETUS IN UTERO

Usually a general anaesthetic is not required, for the necessary manipulations are quite endurable, and the expectant mother is not oversensitive. But in exceptional cases, the malplacement may be intractable, or the patient may be over-anxious. Complete muscular relaxation under ether may help the difficult manipulation, while if the psychological factor is the only difficulty, light gas-oxygen anaesthesia is valuable. Spinal analgesia will relax the abdominal wall completely, but the uterus in such circumstances is firmly contracted, and thus it may not be possible to turn the fetus.

LABOUR

I need hardly remind you that early in the history of anaesthesia the pain of normal labour was treated by inhalations of ether and of chloroform. Sir J. Y. Simpson not only was the first to demonstrate the anaesthetic properties of chloroform, but also his vigorous advocacy of its use in midwifery was soon supported by the consent of Queen Victoria to be herself chloroformed in child-birth — thus, "*chloroform à la reine*". Recently, Mrs. Stanley Baldwin has led a campaign to provide "Anaesthetics for British Mothers". I think that medical opinion is agreed that the matter as raised by Mrs. Baldwin is debatable on several grounds.

Although millions of mothers have received chloroform, a few points in its use may be worthy of mention. During the first stage, chloroform is rarely needed. In the second stage, amnesia should be aimed at. Analgesia, and sometimes light anaesthesia and permissible but full anaesthesia, stops uterine peristalsis, and post-partum hæmorrhage becomes a serious risk.

Many times it has been said that chloroform is safe for pregnant women, but that is not quite true. Light chloroform *à la reine* is indeed surprisingly safe, but I know two medical men who have each lost a patient from heart failure during the application of forceps under full chloroform anaesthesia. Removal of the mask should precede application of the forceps. To allow the patient to administer chloroform to herself by squeezing the bellows of a Junker's inhaler is accepted practice, but be careful that the Junker's bottle is tested and fixed firmly out of harm's way lest a pool of chloroform in the bed lead to severe burns.

Ether was used for midwifery before chloroform was discovered. It is pungent for the patient, it causes secretion, bubbling and cyanosis, when atropine has been withheld, and the stages of amnesia and analgesia are not maintained quite so readily as with chloroform. Nevertheless, my friend Dr. McCardie, from his long and skilled experience, assures me that, for a patient who is exhausted from a long labour, ether may prove an invaluable stimulating analgesic.

During recent years, gas-oxygen has received much attention in connection with midwifery. Dr. H. E. G. Boyle, of St. Bartholomew's Hospital, has been a pioneer and he recommends that a gas bag, distended with a four to one gas-oxygen mixture, should be held in the patient's hand. Following instructions which have been given to her, when she feels a pain coming, she takes four to five deep breaths from the bag and strains down. Thus partial loss of pain, good pressure from the abdominal wall, and strong uterine contractions are secured. Dr. Boyle thinks that oxygen itself promotes contraction, (perhaps by eliminating sarco-lactic acid and thus preventing muscular fatigue). A little ether may be added when the head is passing over the perineum, and the child is then born in a lively condition. The method is of undoubted value, but the cumbersome nature of the apparatus tends to limit its employment to maternity hospitals and clinics. For the more protracted and serious complications of obstetric work, such as high forceps, craniotomy, and the like, gas-oxygen by its low toxicity and freedom from after-effects has saved many lives.

Avertin, the new anæsthetic drug from Germany, has been tried in this connection. My colleague, Dr. Doris Wall, reports as follows:—

Avertin is pleasant in its induction and has no action upon the fetus. There are no unpleasant after-effects, and there is the advantage of complete amnesia, extending some hours after the delivery, and long after the analgesic effect has passed off. The depth of anæsthesia produced is about that of twilight sleep, and, when given in divided doses to a primipara, it can be made to last throughout the second stage, although this is sometimes difficult. Its duration appears to be increased by injecting the drug dissolved in milk. The rate of the pains is slowed down to about half, although their intensity is only slightly diminished. If any manipulation is required, avertin must be supplemented with a little ether, or with gas and oxygen.

The speaker finds that colonic-oil-ether has a similar effect, but, during induction, it is not so pleasant for the patient, and it leads to more congestion and to deeper anæsthesia.

Spinal analgesia has been employed by many workers. Dr. Cosgrave in 1928 reported unequal results. Often the uterus was flaccid and the perineum relaxed. Probably this was due to a low injection—a caudal block. High intrathecal injection, with muscular paresis

and analgesia up to the costal margin, always produces relaxation of the trunk and lower limbs including the abdominal wall and the perineum. At the same time, in my experience, the uterus contracts tonically.

The effects of this contraction, I find, differ according to the stage of labour at the time of the injection. Injection of a spinal anæsthetic *before the os is fully dilated* leads to stoppage of uterine propulsion, and the fetus does not progress until the anæsthetic effect has worn off.

Injection *after the os has dilated to the full extent* may enable the accoucheur to compress the uterus sufficiently to expel the child with comparative ease, or else forceps may be applied, or, finally, the fetus may not progress at all.

Injection *after the head has descended through the pelvic canal* may lead to immediate delivery, especially if the child is small, and usually the child is readily expressed by gentle manual pressure on the abdomen.

It will be seen that the indications for spinal analgesia in normal labour are not impressive, but in a small series of cases, in the presence of severe heart disease, I have found the method of service. I inject the solution at the beginning of the second stage, when the os is fully dilated and the expulsive pains are strong. It is at this time that the diseased heart commences to run the gauntlet of overstrain. The immediate relief from straining down helps the patient to a remarkable extent. Forceps can usually be applied with comparative ease, and slow steady traction, accompanied by pressure on the uterine fundus, yields a satisfactory delivery. Birth of the placenta follows usually at once, for the organ is exfoliated by the strong shrinkage of the uterine wall. Postpartum hæmorrhage has not occurred in my experience, and indeed bleeding has been scanty.

Epidural anæsthesia has received some attention. Dr. Rucker, in 1928, reported that he found failure to produce analgesia to be not uncommon, and that of course is a serious drawback.

We conclude, therefore, that in labour chloroform is the most generally useful anæsthetic, while gas-oxygen is the safest. Analgesia by, either the spinal or by the local

technique has but a limited field. I may add that a woman told me the other day that, in 1918, when she was near the term of pregnancy, an air-raid frightened her so much that she was unconscious for two days. During this time her baby was born. But it seems a gross method to employ a Zeppelin to produce twilight sleep.

EMPTYING OF THE UTERUS BY DIRECT OPERATION

Evacuation of an immature fetus, of a mole, or of other retained products of gestation may require a simple dilatation and curettage, or division of the cervix may be advisable.

Dilatation under chloroform is attended with the risk of reflex cardiac syncope; gas-oxygen often fails to relax the legs sufficiently to allow of a satisfactory lithotomy position; and with all forms of general anaesthesia the risk of dangerous postpartum hæmorrhage is very grave. Considerable loss of blood is not uncommon, while fatal hæmorrhage has occurred in the practice of many experienced gynaecologists. At the Birmingham General Hospital, Professor Beckwith Whitehouse, Mr. Alfred Danby, and the anaesthetists have come to regard spinal analgesia as a valuable safeguard against this danger. With analgesia up to the level of the umbilicus we find that strong tonic contraction of the uterus is the invariable rule. The loss of blood at the time of the operation is remarkably small, the post-operative loss is lessened, and the firmly contracted uterine wall offers satisfactory resistance, so that the curette or the ovum-forceps can be employed without much fear of perforation of the uterus. The presence of phthisis is often an indication for evacuation of the uterus, and because inhalational anaesthesia is undesirable, spinal analgesia had proved most helpful in a considerable series of these cases. The toxæmias of pregnancy, diabetes mellitus, kidney disease and heart disease are complications which are rendered less dangerous by the use of spinal analgesia for this operation.

Anaesthesia for Cæsarean section provides a subject for a long discussion. However, in the short time at my disposal, I shall summarize my views as concisely as possible.

Inhalational anaesthesia is the usual method. Chloroform, ether, nitrous-oxide-oxygen, ethylene-oxygen, acetylene-oxygen, each has its ad-

vocates. The aims of the anaesthetist are to avoid poisoning the mother with the drug, to prevent cyanosis, to keep the circulation brisk and the uterus free from congestive engorgement, and to allow the baby to be born in a lively condition, with the least possible amount of the anaesthetic drug in its circulation, so that it may cry and expand its lungs at once. It appears therefore that the gases, nitrous oxide and ethylene, are the more satisfactory anaesthetics because they are not toxic and they are rapidly eliminated from the baby's blood-stream. In any case, we advise that morphia should be withheld before Cæsarean section, and that the anaesthetic should not be commenced until everything is in readiness for the operation; that is to say, the skin should be prepared, the towels adjusted, and the surgeon gloved and gowned.

The heavy abdominal contents may press on the heart and the bases of the lungs so that additional oxygen may be necessary, until the uterus has been emptied. After the extraction of the child, anaesthesia may be deepened by the addition of a little ether.

Considerable experience with general anaesthesia for Cæsarean section has shown that a smart hæmorrhage from the incised uterine wall is the rule, and, not infrequently, it may be some minutes before the injection of pituitrin and ergot, together with the application of hot towels, and massage of the flabby uterus induces the organ to contract down and to arrest the bleeding.

In December, 1922, Professor Whitehouse and I employed spinal analgesia for Cæsarean section in a young woman, A.F., aged 29, who was suffering from diabetes mellitus. We reported the case, together with a second, at a meeting of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine in 1923, and we laid special emphasis on certain advantages which spinal analgesia presented. Powerful and sustained tonic contraction of the uterine wall rendered the uterine incision almost bloodless, and the suture-line was tight and accurate. The child cried immediately after it was extracted, and the mother made excellent progress.

Since that time I have employed spinal analgesia for most cases of Cæsarean section in which the patient and the surgeon were willing.

The account of the technique and of the results, which I shall now proceed to give you.

is illustrated by the analysis of 100 cases of which satisfactory records have been available. They were treated at the General Hospital and at the Maternity Hospital, Birmingham, and in private practice. The majority of the cases were operated upon by Professor Whitehouse, to whose interest and initiative this work owes a very great debt. Sedative drugs such as morphia were not given until after the delivery of the child, in order that the child might be born free from respiratory depression.

One might think that these women would be panic-stricken at the idea of such an extensive procedure taking place while they were conscious. But even the most apprehensive of women, once the injection has been accomplished, settle down quietly with the will to go through with the business. In eighty replies to our enquiry, as to their progress in hospital and subsequently, there has not been a single complaint concerning the method. One woman who had undergone Cæsarean section on two occasions, the first under "spinal" and the second under general anæsthesia, called upon me the other day to express her gratitude and her preference for the spinal method. In four instances, patients in this series asked for spinal analgesia for a second Cæsarean section, although one of them had suffered from a severe post-anæsthetic headache after her first Cæsarean section.

So much has been said and written on the different methods of producing spinal analgesia, such as light and heavy stovaine, spino-cain, novocain, perocain and tropacocain, that I shall not dwell at length on the subject of technique. In this series 10 per cent novocain was used on one occasion with success, but, for the remaining ninety-nine, the anæsthetic solution employed consisted of a 5 per cent solution of tropacocain in normal saline. This solution has a specific gravity of 1016, and it is therefore heavier than cerebrospinal fluid whose specific gravity is 1006.

1.75 c.c. to 2.25 c.c. of this solution (according to the size of the vertebral canal) are injected into the second lumbar space, while the patient lies on her left side. We have formed the opinion that it is wise to prevent excessive loss of cerebrospinal fluid. In a test series, some years ago, headache occurred in nine out of

thirteen patients where more than 5 c.c. of fluid escaped.

The patient is turned gently on her back, her eyes and ears are covered, but her face is left free, lest she complain of feeling stuffy. The table is tilted 25 degrees from the horizontal, with the head lowest. Analgesia develops to the level of the costal margin, or even as far as the level of the nipples. Failure to produce analgesia up to this level occurred only in two cases, due probably to an insufficient bulk of the solution. It is rarely that special technique is necessary for the actual lumbar puncture. In seven cases gas-oxygen was given throughout the operation, but, although the uterine contraction was satisfactory, the child was dazed for a few minutes after birth. A single dose of ethyl chloride gives one minute's anæsthesia, during which the back muscles are relaxed, the lumbar injection is made, and apprehensive individuals, after regaining consciousness, soon settle down.

Dryness of the mouth is the source of much discomfort, but satisfaction is derived from the sucking of the end of a wet pad of gauze.

As soon as the skin becomes anæsthetic, we notice that the uterus appears to bulge more prominently, and it becomes more hard to the touch. When exposed, it is found to be firm and wrinkled with vertical ridges. The direction of the ridges suggests overaction of the circular muscle fibres, and Whitehouse and I have adduced evidence experimentally to show that spinal analgesia produces strong contraction of the circular fibres of the uterine muscle. This gripping effect of the uterus explains the failure of spinal analgesia, when given for miscarriage or labour, to expel the uterine contents.

In about half the cases, the pressure exerted by the firm, erect uterus on the abdominal contents caused retching, but in nearly every instance the discomfort and the retching ceased as soon as the child had been extracted and the uterus had contracted down.

Notwithstanding the necessity, in some individuals, of opening into the uterine cavity through the placental site, when that organ was anterior, severe bleeding did not occur in a single instance.

Pituitrin and ergot were reserved for the relaxation of the uterus which sometimes happened after the effect of the tropacocain had passed off. The ischæmic pallor of the uterine wall

was always remarkable. Indeed, in the majority of cases, the total loss of blood during the entire operation did not exceed one tablespoonful. Fifteen patients were in labour at the time of the operation; eighty-five patients were not in labour. The uterine contraction was equally successful in all of them.

Provided that narcotic drugs have been withheld, the child kicks and cries immediately it is withdrawn from the uterus. For a tired fetus, at the end of a long obstructed labour, in many instances this freedom from drugging at Cæsarean section spelt life instead of death.

The placenta is extruded by the strong contraction of the uterus, and the membranes rarely present difficulty.

Suture of the uterine wound is done neatly and firmly, for the edges are clean-cut, and any tendency to relax subsequently actually increases the tension of the sutures.

After completion of the operation, the patient is carried to bed very gently, and her legs kept higher than her head. The lower half of the mattress is raised so that the legs are kept up, with the body horizontal and the head on a pillow. This position is maintained for five or six hours, and for twenty-four hours every effort is made to keep the patient quiet.

A few hours after the operation, the uterine pains may be severe. Morphia is a great help. At one time we employed scopolamine in addition, but an anxious case of violent mania dissuaded us from the use of this drug.

Abdominal distension for two or three days occurred in 20 per cent, but this is a frequent sequel to any abdominal section.

During the periods of influenzal epidemics, and in sufferers from bronchitis, mild lung complications occurred. There were no fatal cases from pneumonia.

By far the most unsatisfactory aspect of this procedure was "spinal headache", which occurred in 24 per cent of this series. The headache started within twenty-four hours of the operation, it was sub-occipital in location, and lasted, either continuously or intermittently, for one hour, or for as long as a fortnight—in the majority of cases for twenty-four hours. Undoubtedly, headache occurs after plain diagnostic lumbar puncture, after spinocain, novocain, stovain, and percain. Without detaining you with a lengthy discussion, I would point

out that there is good evidence to show that the following precautions are valuable: (1) Use only solutions which have been freshly prepared. (2) Do not allow much cerebrospinal fluid to escape. (3) Avoid puncturing the blood-vessels on the anterior wall of the vertebral canal. (4) Do not inject air bubbles. (5) Handle the patient gently; do not move her more than is necessary, and keep her quiet for twenty-four hours after operation.

There were no permanent complications attributable to spinal anaesthesia. The method was especially valuable in cases of phthisis, heart disease, kidney disease, diabetes, goitre causing tracheal obstruction, and so forth.

Only one case died at, or just after, operation, and she was actually expiring from heart failure before the operation commenced.

I have gone into this method at some length, for Professor Whitehouse and I believe that it is valuable, if carefully carried out.

OPERATIONS ON THE GRAVID UTERUS AND ITS CONTENTS

Removal of the gravid uterus, in the later stages of pregnancy, is a severe procedure. Most frequently the operation is called for in the presence of concealed accidental hæmorrhage, or for severe sepsis in the pelvic organs. It is one of the most anxious operations of surgery. The patient is toxic, shocked, and bloodless. The more powerful anæsthetic agents, chloroform and ether, disturb the patient too much. They are followed by serious post-operative reaction, and pneumonia, or failure of the heart or kidneys, may follow.

Spinal analgesia may produce a dangerous fall in blood pressure, in a patient who is already nearly pulseless. But, a patient, B. T., aged 26, after Cæsarean hysterectomy under "spinal analgesia" in 1923, although she suffered from extremely severe post-operative pneumonia, recovered and she wrote to me this year to say that she was in good health.

Gas-oxygen is a most valuable aid. In eight Cæsarean hysterectomies under gas and oxygen for concealed accidental hæmorrhage, each patient was nearly in a dying condition when the operation was commenced. One patient died half an hour after the operation was completed; one died on the sixteenth day; the remaining six recovered.

In conclusion, therefore, I would summarise my views as follows: (1) By a wise choice of method, the anæsthetist may be able to offer valuable help to the obstetrician and to the gynaecologist. (2) In the more severe procedures, gas-oxygen is the best agent for general anæsthesia. (3) Spinal analgesia has an important place in the technique of Cæsarean section.

I have to offer my thanks to Mr. J. T. Hewetson, Professor Whitehouse, Mr. Lewis Graham, Miss Hilda Shufflebotham, Mr. Alfred Danby, Mr. Kenneth McMillan, and Mr. R. P. Graham for permission to refer to patients who have been under their care. To Sister M. H. King, of the General Hospital, and to Sister Knight, of the Maternity Hospital, Birmingham, I owe my grateful thanks for enthusiastic help.

DISCUSSION

DR. S. JOHNSTON (Toronto) congratulated Dr. Featherstone upon his paper. He considered that where operations were being performed upon the gravid uterus, and when pregnancy was to be allowed to continue, both pre-medication and post-medication were most important factors. He cited a case in which myomectomy was performed in which the patient was given an opiate previous to the operation and was subsequently kept under the influence of this drug for five days. Dr. Johnston expressed the opinion that nitrous oxide and oxygen were of the utmost value in this type of work. An analysis of 150 operations performed under this anæsthetic upon pregnant women at the Toronto General Hospital showed that the highest mortality occurred in toxic patients. Dr. Johnston regarded chloroform as a dangerous drug and in no circumstances would he allow a patient in labour to administer this anæsthetic herself. If he were handicapped by lack of assistance, he would first administer ether and then carry out any necessary operative measures. He did not agree with the statement that ether generally caused secretion bubbling and cyanosis. If this anæsthetic was given carefully by the drop method there should be little or no cyanosis. He had found spinal anæsthesia of great value in diabetic patients, but in those with cardiac conditions, a great deal depended upon the extent of the lesion.

DR. W. WEBSTER (Winnipeg) considered that in pregnancy an anæsthetic which was both absorbed and excreted rapidly was of prime importance; he therefore regarded ethylene and nitrous oxide as of great value, and it was his practice to use one of these as an analgesic. He objected to spinal anæsthesia for the reason that it contracted the circular muscle of the uterus and, therefore, was prone to delay labour.

DR. BOTSFORD (San Francisco) regarded nitrous oxide and oxygen as absolutely safe. She did not practice pre-operative medication because she regarded it as having a deleterious effect upon the child. Ether was used in addition when labour was prolonged, but just before the child was born the mother was flooded with oxygen. The administration of sodium amylal was attended with good results to the mother, the drug producing a condition resembling scopolamine—morphine narcosis. Several fatalities had occurred, however, to the child.

DR. D. LAMB (Glasgow), on behalf of the Scottish Society of Anæsthetists, thanked the Canadian Medical Association for its hospitality. He stressed the different conditions under which midwifery was practised in North America and in the British Isles. The administration of nitrous oxide must be confined of necessity to hospitals, whilst for domestic midwifery nothing equalled the administration of small whiffs of chloroform. This could be done by the patient herself and was perfectly safe and perfectly effective. The popularity of this method was its own guarantee.

DR. R. WATERS (Madison, Wisconsin) stated that chloroform was largely used in midwifery in American rural districts. He considered that when spinal anæsthesia was employed, oxygen and carbonic dioxide should be used in addition, to maintain correct alveolar balance.

DR. J. S. LUNDY (Rochester, Minn.), said that recently it had been shown that chloroform had very little effect upon newly formed liver tissue and this probably accounted for the innocuousness of this anæsthetic to the fetus.

The President, MR. APPERLEY, commented upon Dr. Lundy's statement. Some years ago he investigated the action of chloroform upon liver tissue and he found that some livers were damaged more easily than others. Perhaps Dr. Lundy had found the true explanation. He used spinal anæsthesia in cases complicated with cardiac disease but he regarded nitrous oxide and oxygen as the ideal anæsthetic for pregnancy.

EXPLOSIVE ANÆSTHETICS.—H. B. Williams (*J. Am. M. Ass.* 918, March 29, 1930), reporting for the committee of the physical therapy council of the American Medical Association upon the possibility of explosion of ethylene and other combustible gases used in inducing anæsthesia, considers that there is a real danger where ethylene or ether vapour is mixed with O or N₂O, and contained in or passed through rubber bags and tubing; the risk is increased by the practice of washing out the apparatus with oxygen-rich mixtures, and administering these to the patient. Although every care may be taken when the cautery is used, the fact that the mixture in the patient's lungs and upper air passages may become explosive by mingling with respired air is liable to be overlooked, and may result in a disaster. Less obvious causes of ignition are the electric sparks which may result from the re-establishment of electrical equilibrium after charges have accumulated, in consequence of

friction upon some insulated rubber portion of the apparatus. Experimentally, sufficient voltages to cause an explosion were obtained under favourable circumstances by friction of rubber surfaces against each other, though the spark was quite small and almost noiseless. The remedy advocated is the elimination of rubber, the equipment being made conductive throughout. Williams remarks that ethylene, being more dangerous in this respect than ether, should never be used for operations with the cautery or diathermy apparatus; ether should never be employed in any throat operation with such instruments. Care should also be taken not to comb or stroke the patient's hair until the ethylene has become thoroughly dissipated. The majority of explosions with ethylene were bound to occur towards the end of the operation, and this, according to Williams, may be due to the practice of washing out the patient's lungs with a mixture of O and CO₂—*Abs. Brit. M. J.*, July 19, 1930.

THE DIAGNOSIS AND TREATMENT OF INFLAMMATION OF THE MAXILLARY ANTRUM*

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THE extraordinary frequency with which the mucosa of the accessory nasal air cells is involved in varying degrees of nasal inflammation permits one to consider this disease, when affecting the largest of the air cells, as having to do with many patients whose chief complaint is one of nasal discharge. The maxillary antrum is formed by a bit of nasal epithelium thrusting itself into the soft maxillary bone and eventually hollowing it out into the largest of the nasal accessory sinuses and lining its walls closely with an epithelial sheet. The air cell thus formed communicates with the nose at the upper and inner angle of the cavity, which is obviously a poor place for drainage. If this cavity is filled with fluid, it will not run out into the nose until the fluid reaches the level of the ostium, or until the patient lowers his head so that the opening is sufficiently dependent. Nature, however, frequently supplies an accessory ostium situated a little lower and behind the natural one, which makes for easier drainage. No other accessory nasal air cell has such poor drainage.

As the antral lining is but a continuation of the nasal mucosa, it is obvious that whenever the nasal mucosa becomes markedly inflamed a similar process takes place in the antrum, and, if the inflammation is severe and persistent swelling of the mucous membrane at the ostium completely shuts off the antrum from the nose. In this manner an acute rhino-pharyngeal inflammation may initiate an acute inflammatory process in the antrum of Highmore.

The normal thin layer of mucous membrane that closely lines all the irregular inner surface of the maxillary antrum bears the brunt of the changes that take place when an inflammatory process occurs, and irrespective of the essential causative factors the process in practically the same. The change is one of edema of varying intensity. The surface of the mucosa is swollen and the network of fine connective-tissue fibres

is separated by a homogeneous or finely granular material forming various-sized cavities or inter-spaces filled with coagulated serum. The surface epithelium is usually shed in places but not necessarily lost entirely. Some of these tissue spaces may rupture their walls, becoming quite sizable cavities, and are really cysts. The ostia of glands may be closed and a different type of cyst formed with an epithelial lining, really a retention cyst. Round-cell infiltration is found below the mucosal lining and about the blood vessels and glands. Engorgement of the blood vessels, with frequent extravasation, is marked; lymphocytes and polymorphonuclear leucocytes infiltrate the superficial structure of the mucosa. The bone itself is practically never involved except in syphilis or malignancy.

The air-containing space of the antrum is thus greatly restricted and is partially filled with the usual products of acute mucosal inflammation. In some places the engorgement of the mucosa is so great that by pressure alone it is pushed out through, probably, an accessory ostium into the nasal cavity, where it is a dependent piece of oedematous mucous membrane—really a nasal polypus. When recession of the mucosa in the antrum takes place as the inflammation subsides, this protruded portion may not recede owing to its having become too large, and we then have the beginning of what is termed a choanal polypus in the posterior nares.

In the great majority of instances the mucosal inflammation of the maxillary antrum is caused by acute rhinitis. The nasal inflammation may be a severe cold, or a more formidable infection, such as is seen in acute influenzal epidemics. The acute exanthemata and diphtheria seen in young children may be the initial source of an antral empyema that may be carried through to adult life. Trauma may be a causative agent in various ways, *viz.*: external violence, causing fracture of the maxillary bone; sepsis following operation within the nose; or tight and prolonged packing in cases of severe epistaxis; infection

*Read at the fiftieth Annual Meeting of the Ontario Medical Association at Toronto, May, 1930.

following diagnostic puncture; and infection following extraction of teeth, where the antrum is opened. Inflammation is not infrequently associated with dental caries of root abscesses in those teeth closely related to the floor of the antrum, *i.e.*, the second bicuspid, the first and second molars. Infection of other sinuses, as the ethmoid and frontal, may be the cause of antral suppuration; in fact the antra may be the reservoir into which an acutely or chronically inflamed frontal sinus empties. Structural changes within the nose, such as septal deflection, interfering with proper ventilation and drainage and intensifying the coryzal symptoms, are also factors to consider. Hypertrophied turbinates, and hypertrophy of the mucosa of the anterior lip of the unciform groove, new growths, nasopharyngeal conditions, such as enlarged adenoids, act in the same manner. Lastly, we must consider the relationship between simple antral oedema and allergy. Is there such a thing as an oedematous diathesis? If the dermatologists can speak of eczema as a diathesis, the internist of asthma as a diathesis, or the surgeon of gall-bladder disease as a diathesis, why cannot the same term be used in a limited extent in antral oedema, especially the chronic type? In the chronic catarrhal type of antral disease allergy—a state of spontaneous or induced susceptibility—is a factor not by any means rare.

SYMPTOMS OF ACUTE ANTRAL INFLAMMATION

Acute antral inflammation may take place, and in some measure always does so, during an acute nasal inflammation, and subsides *pari passu* with the rhinological condition, without any special symptoms pointing to its presence. The intensity of the "head-cold", and the persistence and tenacity with which it seems to last, are measures of the degree of accessory air-cell infection also present.

When the suffering is intense or prolonged, so that characteristic antral symptoms might be present, some additional complaints are noted by the patient. These may be—

1. An excessive nasal discharge, purulent or muco-purulent in character, with or without odour. The discharge rapidly forms and necessitates the use of many handkerchiefs a day. It is usually increased on leaning forward, and on nasal examination will be found coming from the upper and outer part of the nose, under and external to the anterior end of the middle turbinate.

2. Pain in the face, increased on leaning forward, and some tenderness in the canine fossa. The upper teeth may feel too long or unduly sensitive, one or two obviously diseased ones may ache. Pain over the forehead is frequent in antral inflammation, and is often taken for a positive sign of acute frontal inflammation, but in such instances the roof of the orbit is not tender. There is usually some fever and acute rhino-pharyngeal inflammation, which rapidly subsides as the infective process loses its intensity or the patient overcomes it by auto-inoculation. Fever is, however, not a prominent symptom associated with acute antral inflammation. An irritative condition of the upper respiratory tract mucosa, varying from a slight naso-pharyngeal catarrh to mild tracheo-bronchial irritation, is frequently present after an acute antral inflammation has been well established. It may be a part of the process that originally caused the infection of the antrum, or it may follow the irritation from the discharge constantly draining into the naso-pharynx and from there into the upper air tubes.

A mucopurulent discharge, usually unilateral but possibly bilateral, during an acute coryza, is presumptive of an accessory air-cell involvement. In addition there may be present a copious postnasal discharge, possibly foul-tasting, and especially noticeable when the patient arises in the morning.

If the discharge is in the middle meatus and reappears after wiping away, it may come from the frontal or anterior ethmoidal cells; if re-appearance only is noted after bending the head forward it is obvious it comes from a cavity whose outlet is higher than the floor, *i.e.*, the maxillary antrum. Other presumptive evidence is gained by the use of x-ray and transillumination. The former is usually not necessary in acute cases, as the latter is so much easier of application and quite as definite information is gained. Those who lack faith in transillumination usually do not appreciate its refinements. I prefer the method of Briggs where a focussing electric light is placed just inside the lower border of the orbit and directed downward; the mouth is then widely opened, the corresponding position of the hard palate is examined and compared with its fellow. Both sides should illuminate equally well, if not, something interferes with the passage of light. It may be an unequally thickened bone, a thickened mucosa from former inflammation, an unusually small

antrum, a new growth, opaque fluid or oedematous mucosa in the antral cavity. In the great majority of cases with symptoms of acute antral infection the last is usually the reason for the defective lightening up of the hard palate. There are certain essentials necessary to prevent errors. The room must be very dark, the light must be of sufficient intensity and correctly placed, the observer must wait some seconds in the dark to accustom his eyes to the darkness, and he must be able to appreciate the slight difference of shade while looking at the hard palate. Lack of care and hurried examination easily defeat the purpose. Former operative interference on the antral mucosa alters the illumination considerably, while the removal of an artificial denture is obviously necessary. I myself place great reliance on transillumination when properly carried out and see no reason for the use of x-rays in acute cases.

So far, all one can say is that there is presumptive evidence that an antral infection is present. In order to make sure an additional procedure is necessary, *viz.*, proof puncture. In acute cases the puncture is a proof, but this does not obtain in chronic cases where secretion does not always form the main pathological process. The antrum may be washed out through the natural ostium. I do not do so. I much prefer passing a straight trocar through the bone separating the antrum from the nose in the inferior nasal meatus. Under local anaesthesia this is a very simple and almost painless procedure. There again a knowledge of the refinements of local anaesthesia in the nose make all the difference between a very distressing procedure and one with little or no discomfort. An ordinary enema syringe is then attached to the trocar, and, without blowing in any air, the cavity is flushed while the patient holds his head over a black basin, for with a black background the character of the secretion is much more easily determined.

If the return flow is very slow or absent, one should think of the trocar as not being free in the cavity. Owing to a greatly thickened mucosa and with a dull trocar it is easy to push the lining membrane in front of the instrument, thus preventing the fluid reaching the ostium. The tip may be in the proper place, but the narrowness of the ostium may prevent exit, or a polypoid area of membrane may be flushed up against the ostium and act as a ball valve, preventing flushing of the cavity. Altering the position of the

trocar may be sufficient to overcome the difficulty. On no account should great force be used with the syringe. If the content of the antrum be very thick and, owing to its consistency alone, cannot be removed the use of a little H_2O_2 might be helpful. Sometimes the use of two trocars in the same antrum is required to get a return flow from the cavity; in this case, of course, the return is through the other cannula. Other conditions that may prevent a return flow are that the trocar may be in the cheek owing to a deeply placed canine fossa; or the trocar may have passed through a small antrum and entered the orbit or outer wall of the cavity; or there may have been a very small antrum, one with a partition, or even an entire absence of the cavity. All these difficulties are of rare occurrence and should not deter one from becoming familiar with the simple procedure of irrigating an antrum. I think every general practitioner should be able to do this, and the more familiar he becomes with a head mirror, the easier will he be able to carry it out. I am opposed to blowing air into the antrum before or after irrigating—some thirty-five deaths are recorded following such procedure. Air embolism or vagus inhibition is usually the reason given for death. Nevertheless, many practitioners have been using the air douche all their lives and have had no disasters.

One irrigation may be quite sufficient to relieve all discomfort and reduce the inflamed mucosa enough to permit of resolution taking place without any further attention to the antrum. This, however, is not the usual course and repeated irrigations are necessary. They should not be carried out more often than is required to make a very marked change in the character of the secretion. When it becomes more gelatinous or changes into a lemon-coloured mucoid mass, irrigation is best omitted, for the inflammatory process is then likely to subside without further assistance. Measures then directed to lessening the turgescence of the nasal mucosa are all that are necessary.

If, on the contrary, after some weeks a nasal or post-nasal discharge still persists, additional measures may be advisable. These steps should have for their object improved facilities for drainage and ventilation, and are secured by enlarging the opening under the inferior turbinate or in the ostium area beneath the middle turbinate. The former is preferred and is easily done under local anaesthesia. If the inferior turbinate

hugs the antra nasal wall closely, it may be inflected a little, so as to facilitate the passage of instruments to break down the antro-nasal wall. Subsequent irrigation is then easily carried out, and the patient himself may be taught the knack of irrigating his own antrum with a suitable curved cannula. The instillation of neo-silvol, zinc sulphate, or even ionization, may be helpful.

In the vast majority of cases of short duration the above measures are all that are necessary to relieve the pathological process present in the mucosal lining of the maxillary antrum.

In cases where puncture of the antrum for some reason is not performed, relief from pain should be secured by the free use of aspirin or codeine. Nasal irrigations, applications of cocaine, and adrenalin in the middle meatal region will lessen the swelling about the ostium. The middle turbinate may be large and, if closely applied against the hiatus semilunaris, should be pushed well away so as to facilitate drainage and ventilation. An ephedrine oil spray is also helpful in controlling the nasal engorgement. The use of heat is comforting and may be used in the form of nasal irrigations and the hot water-bag. The head and face should be protected from draughts. Cases of dental origin should have the required attention, but if the dentist decides to extract a tooth no enlargement into the floor of the antrum should take place.

Failure of the mucosa to return quite to normal tends to repeated mild attacks of inflammation during every bout of coryza. This, together with that condition of mucosal surfaces where oedema easily takes place, whether by allergy or by some inborn tendency to oedematous changes, a diathesis if you like, leads to a state of chronic inflammatory oedema of the mucosa in which we have a permanent thickening of the mucosa with polyposis. This process seems to be inborn with certain individuals, and is often found in patients with a family history of hay-fever, asthma, eczema, or urticaria. It is not a disease but a vulnerable soil that has been inherited.

Some patients who have pain over the antrum have, in addition, some swelling of the cheek, and this has led to frequent errors of diagnosis. It cannot be too strongly stated that external swelling is not associated with acute antral inflammation. When swelling with tenderness occurs, alveolar abscess, suppurating dentigerous cyst, should be kept in mind. Chronicity of the facial swelling, with or without tenderness, nasal

obstruction or discharge, suggest the possibility of new growth within the superior maxilla.

SYMPTOMS OF CHRONIC ANTRAL INFLAMMATION

Chronic catarrhal inflammation of the maxillary antra is always due to repeated attacks of acute inflammation in which the inflamed oedematous mucosa does not return to normal. In this type, however, the pathological process attacks not only the superficial layers but also the deeper structures of the membrane. The microscopic characteristics are much the same as in the acute form, but, as just mentioned, the cellular infiltration extends to the deeper layers, which may be considered the periosteum.

Cysts are more common; irregular oedematous masses and diffuse hypertrophies are frequent. Some areas of the cavity may be more involved than others, and especially is this noticeable in antra where deep irregular recesses are present. Any structural abnormality in the nose preventing free drainage in the infundibular area, such as a large cystic middle turbinal or hypertrophy of the antrum lip of the unciform groove, tends to retard resolution in the acute cases and add to the liability of chronic oedematous change taking place.

The symptoms of the chronic type are largely those of nasal discharge, chronic rhinitis, with varying degrees of nasal obstruction due to engorgement of the turbinate mucosa. The discharge may be very thin and scanty, or may mostly drain into the naso-pharynx. Frequent sneezing and profuse watery nasal discharge are common complaints. Many patients complain of persistent postnasal discharge, noticed mostly in the morning when the posterior wall of the naso-pharynx is coated with a thick tenacious mass of muco-purulent material. This is caused by the antral secretion drying on the pharyngeal wall. Of course this may have its origin in the posterior ethmoidal cells or sphenoid, but, nevertheless, I attach great diagnostic value to the presence of this so-called post-nasal catarrh.

The chronically oedematous mucosa has various degrees of activity. During an acute head-cold the antrum may go through the same process that we have seen during an acute catarrhal inflammation, and nasal and post-nasal discharge is the most prominent symptom. If the antrum during this period is irrigated muco-pus easily mixing with water is obtained, but when the inflammatory activity is at the lowest, and

the patient has little or no head-cold, or so-called catarrh, irrigation of the antrum may be practically negative unless care be taken to allow the washing to settle in a dark basin. If a needle is put into the antrum and some solution is withdrawn, the presence of lymphocytes and polymorphonuclear leucocytes suggests chronic inflammation. Sometimes during the quiet stage the antrum contains a very highly elastic jelly-like secretion that does not come away on irrigation, and in the more chronic cases caseous material is frequently found.

The diagnostic measures used in the chronic catarrhal condition are much the same as in the acute form. X-ray pictures are now of more value, but have their definite limitations. Many are badly taken and interpreted without any accurate knowledge of the pathology they attempt to portray.

The information one wishes to obtain is as to the character of the mucosal lining. This is obtained better if the antrum is injected with lipiodol and olive oil (1-3), or bismuth in paroline. Not only does one then know the character of the mucosa but one is better able to choose the treatment. A curious thing about the mucosa is its habit of varying its thickness, for one sometimes has an x-ray and lipiodol picture showing very marked thickening of the mucosa, but after a few weeks, at operation, great lessening of the oedema has taken place, so much so that had the picture been taken when this shrinkage took place the membrane would not have appeared much thicker than normal.

The clinical history obtained by careful cross-examination generally affords strong presumptive evidence of some sinus infection. Frequent and repeated attacks of head-colds suggest some irritative focus within or adjacent to the nasal cavity. Persistence of nasal or post-nasal discharge, a long drawn out head-cold, *i.e.*, one that seems to hang on and is associated with the use of many handkerchiefs daily, which, if examined, show evidence of muco-purulent secretion to excess, is the usual picture seen in chronic antral cases with acute exacerbation. With the gradual subsidence of the acute process in the antral mucosa the head-cold disappears. If when the cold has persisted for a while the antrum is washed out, a very surprising amount of muco-purulent material comes away, and with it a clearing up of all the symptoms of the so-called "cold in the head."

Chronic antral oedema is not always diagnosed

by washing out the cavity, since the secretion may be too viscid to come away, or so little may be present that it is missed or may even be dissolved in the irrigation lotion.

Cytological examination of the washing may give strong presumptive evidence of chronic inflammatory changes. Watson Williams, of Bristol, and later, Sewell, of San Francisco, attach very great importance to this method of examination. Polymorphonuclear leucocytes and lymphocytes are always present in a chronically infected antral mucosa. Dean says that the allergic cases are associated with an excess of eosinophiles in the nasal secretion.

TREATMENT

A chronically inflamed or oedematous antral mucosa does not necessarily call for any radical surgical measures. Many of these persons can derive very great benefit by going to a warmer climate or by having some minor nasal operation performed that promotes better ventilation and drainage within the nose. Many things may interfere with the reparative process, and this applies to all other sinuses as well. The patient may have poor recuperative powers owing to ill health produced by anaemia, tuberculosis, syphilis, chronic nephritis, diabetes or any debilitating disease. His manner of living, habits, diet, even the atmosphere in which he works, may have a bearing. The stout, rapid, and immoderate eater and drinker, with chronic intestinal sepsis and constipation, does not clear up well after sinus infections. Lack of exercise and confinement indoors has a definite influence, while in this country the excessive heat and dryness of our living apartments conduce to a permanent nasal and sinus congestion. Extremes of temperature and humidity add very materially to the frequency with which oedema of the mucosa appears. Coldness and dampness of the feet have a tendency to increase very promptly the turgescence of the nasal mucosa membrane, as was first shown by Muecke.

Such measures as correction of a badly deflected nasal septum, or removal of the anterior end of the middle turbinate may be all that are necessary to give the patient relief. If, however, the nasal discomfort and discharge persist, and acute exacerbations do not diminish, some additional measures are desirable. Repeated irrigations of the antrum may so relieve some cases that though there is still considerable antral oedema

remaining, the clinical manifestation of this is so slight that further treatment is not desirable. Should this not suffice additional drainage and ventilation may be secured by making a large opening into the antrum through the inferior nasal meatus through which the patient may wash out his own antrum. The opening is, however, usually made too small and almost always gets smaller still after a short time. It is rather a blind operation after all, and while one may make a large opening in the bony wall, one is not so successful in making as large an opening in the muco-periosteal flap. Nevertheless the simple procedure answers in a fairly large number of cases. Of course, this same opening can be very much better made by working from the antrum when every step is under direct vision, but the whole procedure is a little more formidable even if it is quite feasible under local anaesthesia.

When the intra-nasal opening in the antrum fails to afford sufficient and permanent relief, further measures are advisable. So far, irrigation and ventilation have not been sufficient to remove the cause of the discharge, though the secretion itself has been daily removed by irrigation for varying periods of time. As the cause of the discharge is the cedematous and infected antral mucosa, it seems good surgery to remove it, or at any rate that part responsible for the persistence of the symptoms. An opening made under the lip through the canine fossa permits a direct view of the antral contents. Removal of the antral hypertrophic and polypoid areas by the curette is not thorough enough; simply curetting the antral mucosa does not remove all the disease and tends to the formation of scar tissue with pockets of granulation. With a very considerable experience of all methods of dealing with this polypoid antral mucosa, I am firmly convinced that peeling out the entire mucosa of the antrum gives the best results. If an intra-nasal opening has been made some time before one will be surprised at how futile his efforts have been, and how much more he has to do to secure a wide and permanent opening into the nose. The opening into the nose should be as large as possible, while conserving the articulation of the inferior turbinate. A flap consisting of the membranous lining of the inferior meatus may be laid on the floor of the antrum. The anterior part of the inferior turbinate will require removal in all cases so as to facilitate subsequent intranasal irrigations. The mouth incision is then closed up and what little subsequent treat-

ment is necessary is carried out through the inferior nasal meatus.

Regeneration of the antral mucosa takes place in most cases, as is shown by the work of McGregor and Knowleton, but even when this occurs, leaving a new normal lining, the same pathological process that took place in the original mucosa is likely to recur. This radical measure can be carried out quite satisfactorily under local anaesthesia with the patient in a semi-reclining position. Hunt, of London, Ontario, puts the matter well when he advocated the removal of all the membrane that can be lifted up by a blunt dissection.

The inflammatory reaction in the soft tissues of the cheek is not usually severe. Considerable swelling may take place in those whose tissues are lax, or when too much force has been used in denuding the front face of the maxilla, or when excessive traction has occurred in lifting the soft facial tissues away from the antral opening. This inflammatory cedema may be very much lessened by the use of iced compresses, but to be effective they should be used within a few hours following the operation. Some patients resent the cold and prefer heat, especially if there is any pain. Emmerson favours tight bandaging.

Occasionally, the post-operative condition is very satisfactory for four or five days and then appears a very excessive foul purulent nasal discharge. The antrum seems to secrete a great amount of thin purulent discharge. This is not associated with any constitutional symptoms, and readily responds to saline and monsol irrigations.

Only a moderate amount of discomfort is the usual story patients have to tell following radical measures on the maxillary sinus. Now and then, however, a patient whose antral lining has been removed completely will suffer very severely. The pain sets in after several days and is not associated with any microscopical evidence of inflammatory reaction. Heat and free and continuous large doses of morphia and aspirin are indicated.

CONCLUSIONS

1. The causation of the persistence of most head-colds is due to an inflammatory condition within some of the nasal accessory sinuses; that most commonly affected is the maxillary antrum.
2. Post-nasal discharge, or the so-called "catarrh", is due to seepage from an cedematous

mucosa of an air cell. The most commonly affected is the maxillary antrum.

3. Irrigation of an antrum may or may not be conclusive. A negative irrigation does not by any means rule out mucosal infection.

4. Acute antral infection usually gets well of itself. Many patients are, however, assisted greatly in recovery by a few irrigations.

5. Swelling of the face, or a bulging forward of the cheek bone, is not found in a simple acute or chronic antral infection.

6. The teeth at the floor of the antrum are frequently responsible for the beginning of the antral infection, or for the persistence of one caused by nasal inflammation. The antrum should be left alone by dental surgeons, and no effort made to treat antral empyema through an alveolar opening. Much meddling surgery is now becoming fashionable in this area and facial-antral fistulae are of much more frequent occurrence.

7. A very large proportion of the so-called cases of nasal or post-nasal catarrh will be

found to have their origin in the antral mucosa.

8. The antrum may be only a reservoir for the secretion from chronic ethmoidal or frontal sinus disease. When the antrum is infected along with these sinuses, treatment should include the associated cavity as well.

9. X-ray examination and interpretation of a high order may be very helpful, if taken in conjunction with a knowledge of the clinical symptoms and signs. Taken alone it may be very deceptive. X-ray is a good servant but a poor master.

10. All varieties of mucosal inflammations may be present in the same antrum at the same time.

11. Infection of the mucosa of the maxillary antrum is responsible for most of the nasal complaints in my practice.

12. Some asthmatics, and those with persistent inflammation of the upper respiratory mucosa, derive very striking benefit from radical measures directed to the removal of chronic oedematous changes in the antral mucosa.

THE EARLY DIAGNOSIS OF INFECTIVE LATERAL SINUS THROMBOSIS*

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INFECTIVE lateral sinus thrombosis has for many years been one of the most dreaded complications of suppurative middle ear and mastoid antrum disease. The very high mortality resulting from this condition has, of late years, been largely reduced owing to the gradually increasing knowledge of the earlier symptoms and consequent earlier surgical interference, so much so that the prognosis may now be said to be distinctly favourable in all cases of operation previous to the breaking up of the infected clot.

I have thoroughly examined the notes of the last hundred cases recorded at the London Hospital, and it is remarkable how seldom I have found the more serious or later symptoms, such as rigors and alterations of the central nervous system, mentioned in the notes of the

more recent cases; the mortality also has dropped over 50 per cent in the last ten years. It is, therefore, of the greatest importance to the patient that the earliest symptoms should be most carefully investigated.

Of the 100 cases, 44 were associated with acute aural conditions (six months being taken as the acute period) and 56 with chronic suppurative aural conditions. Six of these cases were admitted to and eventually diagnosed in the medical wards, and one remained undiscovered till the post-mortem examination. The admission diagnoses were pneumonia 2; pyrexia of unknown origin 3; typhoid 1; and septicæmia.

It appears that children are more liable than adults, in the proportion of three to one, and males than females in the proportion of two to one.

Aural discharge previous to admission is almost universal, only 5 of the acute cases having

*The paper opening the discussion on this subject at the Ninety-Eighth Annual Meeting of the British Medical Association at Winnipeg, Aug. 28th, 1930.

no discharge; among the chronic cases 9 are noted as having no apparent discharge, though a history of previous discharge was obtainable in all of the cases.

Herpes and sordes about the lips and gums are extremely common symptoms and were present in almost all the cases. I consider this to be a very early indication.

Severe general malaise is another almost universal symptom of lateral sinus infection. It is probably the earliest of all. In only 3 cases was a positive blood culture obtained out of 42 cases where mention is made in the notes.

Examination of the state of the blood does not help diagnosis, as mastoid infection alone would give similar results. Downey's spinal test is only of value when the sinus clot has completely formed, and is of no assistance in the early stages.

Pain about the ear is another almost constant symptom. In only 2 of the acute and 8 of the chronic cases was this symptom not mentioned, although deep-seated discomfort is frequently mentioned rather than actual pain in many of the chronic cases.

Headache is specially noted in 24 acute and 29 chronic cases, while a feeling of general malaise and ill-being is noted in almost all cases as having occurred in the earlier stages of the illness. Vomiting occurred in 16 acute and 31 chronic cases. The notes prove this to be almost invariably a late symptom, occurring in very acute or advanced conditions. Giddiness was noted only in 3 acute and 8 chronic cases, and I do not think that it is of any special significance in lateral sinus infection.

Temperature on the first day of admission was generally high. It was above normal in 36 and subnormal in 8 acute cases, while in the chronic the numbers were 46 and 8. In 68 per cent of the cases the high night and low morning temperature predominated. Rigors were noted in 26 acute and 31 chronic cases. An early rigor or shivering fit was noted as an early symptom in almost 30 per cent of all cases, but the subsequent frequent rigors were invariably a late and ominous symptom.

Tenderness over the mastoid process occurred in 38 of the acute and 36 of the chronic cases, the most frequent sites mentioned being the tip and directly over the antrum. It was specially noted that in several chronic conditions tenderness was found only on deep pressure.

Tenderness down the neck along the course of the jugular vein was specially mentioned in 11 cases, 2 only being of the acute variety; all except 1 chronic case were in advanced conditions.

Swelling about the mastoid or oedema was noticed in 27 cases, 9 being chronic. It is interesting to note that all these were in children, and it certainly seems that while the path of infection in the young tends to early involvement of the superficial mastoid cells and therefore a more ready diagnosis, in the less frequently affected adult the infection tends to remain in the deeper mastoid cells.

On examination of the meatus, no discharge was discovered in 6 of the acute cases, though in all these the drum is mentioned as red and in 4 as bulging. Similar signs are mentioned in 3 chronic cases.

Redness or oedema of the posterior part of the meatal wall (post-meatal spot) near the drum is mentioned in 31 acute and 39 chronic cases. This I regard as the most important sign of mastoid disease and is alone a certain indication for operation. The presence of this "spot" is invariably mentioned in all cases during the last six years. As an indication of the great value of this sign, 9 of the above cases were unsuspected and were found during the course of operation for chronic mastoid disease on patients with prolonged ear discharge and general seediness, and in whom the meatal spot was the main indicating sign for operation. Where this sign is definitely established I regard operation as imperative, even in the absence of any other operative indication, and I firmly believe that if this rule is observed the dangers of lateral sinus disease will be almost entirely eliminated both in acute and chronic cases.

Ophthalmic changes appear to be rare and except for a very occasional squint (5 cases in all, 2 being chronic) are rather late signs. Papilloedema was noticed in 12 cases (7 being chronic) and nystagmus in 15, 9 being acute.

Changes in the central nervous system were also very rare. Definite signs of cerebral irritation were noted in 8 cases altogether, 5 being of the chronic type, while disturbances of various reflexes were noticed in 14 cases, 9 being chronic. Facial paralysis occurred only in 2 chronic cases. Examination of the cerebro-spinal fluid is of no early value. It will only show whether there is any meningitis or not.

DIAGNOSIS

Having enumerated the various symptoms and their relative frequency I am now in a position to give a short clinical picture of an early case of lateral sinus infection.

If a patient with acute or chronic suppurative otitis media is found to be abnormally ill, yet with nothing definite to account for the grave general feeling of ill-being, suspect sinus infection; look into the meatus and should the red oedematous meatal spot be present—operate! The accompaniment of deep mastoid tenderness, herpes and sordes, a swinging temperature and auditory pain should complete the early diagnosis, and operation should then prevent the occurrence of the more obvious signs.

Another necessary early diagnosis may occur during a mastoid operation when it may be difficult to tell whether the interior of the sinus is infected or not. I make the following observations on this.

In the case of a perisinus abscess and a pulsating sinus surrounded with normal granulations, I have never known this condition not to clear up with ordinary drainage. The wash-leather sinus is the other difficult type. Pulsation may be hard to get, though the sinus is felt to be full. Inserting a needle is dangerous, as is also opening, on account of the possibility of infection. If on compressing the sinus wall with a blunt probe and suddenly releasing I find the wall return to normal evenly and instantly, I always leave things alone and watch for further indications later. This sign has proved to be of great value.

It will probably be a surprise to some of the specialists present that so little has been stated about pathological aids. I wish to make this point very definitely that the early diagnosis of this condition can only be done on purely clinical grounds; if the surgeon waits till the pathologist has made his diagnosis for him the chances of the patient are greatly minimized.

The time to make the diagnosis is in the phlebitic stage, or not later than that of the mural clot. The pathological changes in the blood and cerebro-spinal fluid should have been prevented by the surgeon, and even if the patient is seen only at a late stage, there should be no need for a good clinical observer to lose valuable time in awaiting laboratory tests.

The differential diagnosis at this stage is rendered difficult by the absence of any definite symptoms in an otherwise generally ill condition.

Unless the great importance of a previously discharging ear is recognized, it is quite easy to slip into such diagnoses as pyrexia of unknown origin or typhoid fever.

In all symptomless febrile conditions a thorough search of the usual toxic foci should be undertaken, and it ought then to be well nigh impossible to overlook the existence of a suppurative otitis media. The resulting aural examination would then disclose the presence or absence of the red oedematous meatal spot and offensive discharge. Having now been placed on the right track, the observer should easily elicit the other abstruse signs of an infected sinus. Being absolutely sure of the meatal spot I would definitely insist on a mastoid operation. If there is one thing that has impressed itself on my mind it is the mistake of looking for two morbid conditions in the same person. Coincidences of this character are extremely rare.

The alleviation of a chronic mastoiditis, even if the sinus is not yet infected, must surely be helpful; on the other hand, the finding of a recently infected sinus not only clinches the diagnosis but saves the patient from a much graver situation.

DISCUSSION

DR JAMES T. ROGERS (Montreal) said that the indifference of the public to the potential danger of a discharging ear, and the failure at times of the medical profession to recognize the actual source of the general sepsis, were two factors that seriously militated against an early diagnosis of lateral sinus thrombosis. It is not surprising that many of these cases, owing to the prominence of their general symptoms and the masked ear signs, found their way into the medical wards where they were treated as pneumonia, typhoid fever, meningitis, influenza, malaria or gastro-enteritis. In the early diagnosis of the condition the otologist was influenced by the marked euphoria of the patient, a high septic temperature, chills and sweats, oedema and tenderness over the emissary nerve, tenderness along the course of the internal jugular vein, and the blood picture of high leucocytosis and positive blood culture.

MR. J. F. O'MALLEY, (London) emphasized the importance of tenderness over the mastoid, a sudden rise in temperature and rigor, as pointing to systemic infection and indicating operation. Other symptoms were of lesser importance.

DR. AUSTIN A. HAYDEN, (Chicago) noted with some satisfaction that on the matter of blood culture there was some disagreement, because he felt it was of importance. The leucocyte count was also often very important, as was the haemoglobin estimation. He laid most stress on the following points:—chills and sweats, history of ear discharge, the very characteristic temperature curve, and the feeling of well-being experienced by the patient in the face of an obviously severe illness.

DR. A. LEISHMAN, (Winnipeg) had operated on 703 mastoid cases in 5 years, among which were 18 cases of lateral sinus thrombosis, of which he found only one present at operation. Of the 18 cases there were 11 recoveries. Most of his cases exhibited symptoms about the fifth day, and the first symptom was that of a

chill, though the patient felt particularly well between rigors. He welcomed the insistence by Mr. Muecke on operation before waiting for all the signs of sinus thrombosis to develop.

Mr. A. J. WRIGHT, (Bristol) asked what was the risk of exposing a lateral sinus, and also how far this method of diagnosing the condition was accurate. How often was infection present when the sinus was exposed?

Mr. MUECKE, in reply, said he felt sure that many of the cases described as developing some days later were actually present at the time of operation, others developed from a small spicule of bone penetrating the sinus wall, or because an infected mastoid cell had been left. In reply to Mr. Wright, he considered it better to explore the lateral sinus than to run any risk of overlooking an infected one.

THE DIAGNOSIS OF CANCER OF THE LARYNX*

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EXTRINSIC laryngeal cancer, or cancer of the pharynx which has extended to the larynx, usually comes under observation so late that the diagnosis is obvious. These cases are generally seen by the laryngologist much too late for successful treatment either by operation or by radium, and earlier diagnosis is urgently needed. The problem of early diagnosis is intensified by the fact that cancer in itself does not produce any specific signs or symptoms, and it is only when the cancer cells form a tumour or ulcer that a series of mechanical symptoms and signs appear. These symptoms also develop slowly and insidiously, and it is unusual for the patient to consult a doctor until such symptoms are well marked and until it is often too late for a successful removal of the growth. Moreover, in a hidden cavity like the pharynx where there is room for the growth to expand unseen, the first symptoms are trivial and may be neglected until secondary growths are manifest in the cervical glands.

The intrinsic cancers of the larynx are seen at an earlier stage, as the early symptom of hoarseness sends the patient to the doctor much sooner, but cancer seen in its earliest stage is more difficult to diagnose accurately. Hence cases of intrinsic laryngeal cancer present more frequent and more difficult problems in accurate diagnosis. I propose, therefore, to spend most of the time available in discussing the diagnosis of intrinsic cancer of the larynx. It is to be hoped that the more frequent use of the modern directoscope and direct laryngoscope, and suitable

cancer propaganda, will produce the much needed earlier diagnosis of extrinsic cancer. The earlier stages of these cases may then present as many problems in diagnosis as the intrinsic cases.

EXTRINSIC CANCER

The characteristic and offensive epithelomatous ulcer, commencing just below the aryteno-epiglottidean fold and rapidly involving that side of the larynx, produces fixation of the vocal cord with its consequent hoarseness. The first symptoms are sore throat and pain radiating to the ear, with a definitely tender spot near the greater cornu of the thyroid cartilage; then follows the characteristic hoarseness or roughness of the voice, with a copious frothy blood-stained expectoration. The top edge of the growth can be seen with the laryngoscope and palpation with the finger reveals the stony hard ulcer.

A post-cricoid carcinoma, which commences as a superficial growth on the posterior aspect of the cricoid cartilage in women, soon surrounds the lumen of the pharynx and spreads upwards to form the whitish warty upper edge seen in the later stages behind the oedematous arytenoids. These patients first complain of a soreness or pricking sensation with pain in the ears during swallowing. Pressure on the cricoid backwards against the spine or lateral movement of the larynx produces pain in practically all cases. Dysphagia occurs early and when these symptoms are present without a satisfactory explanation the patient should be examined with a directoscope or oesophagoscope. The laryngoscopic mirror will not show any signs in the early stage, and when the upper edge of the growth is visible the disease is advanced, and matters are still more hopeless when a vocal cord is paralysed.

*The paper opening the discussion on this subject in the Section of Laryngology and Otology, at the Ninety-eighth Annual Meeting of the British Medical Association, Winnipeg, August 28th, 1930.

Neither is the growth within reach of the longest finger, and the passage of a bougie is valueless and even harmful. In the absence of physical signs, the dangerous diagnosis of neurasthenia is still made, but such a diagnosis should never be concluded until the presence of a growth has been eliminated by a direct examination.

Carcinoma in the vallecula, either on the base of the tongue or on the anterior surface of the epiglottis, excavates the base of the tongue and rapidly extends to the surrounding structures and the submaxillary and deep cervical lymphatic glands of both sides are soon involved. The only symptoms are persistent severe pain and a catch on swallowing located by the patient to the base of the tongue, with blood-stained salivary expectoration. Occasionally a chronic paroxysmal cough is the first symptom. Later, the painful and limited protrusion of the tongue with the accompanying trismus impedes laryngoscopic examination, but the growth is within easy reach of the palpating finger and does not require a skilled laryngologist or endoscopist to detect and gauge the extent of the growth. The situation, the characteristic appearance, the odour, and the history of these growths make the diagnosis more or less obvious, but the differential diagnosis should always be considered, as I have seen two cases of syphilis in the post-cricoid region which have been mistaken for carcinoma.

INTRINSIC CANCER

A rapid and accurate diagnosis of a typical case of intrinsic cancer of the larynx is easily made. The characteristic miniature epitheliomatous wart or ulcer situated on the middle or anterior third of the vocal cord in a patient of cancer age, in which the differential diagnosis of chronic laryngitis with pachydermia, tuberculosis, syphilis, and a simple tumour can be undoubtedly excluded, presents no difficulty. Such a growth has been and is frequently removed by operation without a pre-operative diagnostic section. On the other hand, the atypical case, or the hidden subglottic growth, requires considerable ingenuity in diagnosis. The differential diagnosis may be obscure, and tuberculosis is more often mistaken for cancer than any other condition. A chronic tuberculous ulcer of the vocal cord in a man of cancer age, or a healed scarred tuberculous lesion which has broken down with a recrudescence of the disease, closely resemble cancer.

Lupus, owing to its distribution in the soft

tissues, is more readily distinguished, but in both cases tubercle bacilli cannot always be found in the sputum. In a few cases of tuberculosis it is almost impossible to make an accurate diagnosis without microscopy. The guinea-pig test by inoculation from the piece removed unfortunately takes six weeks to mature, but it is so conclusive that it might be useful. Chronic laryngitis with localized pachydermia renders diagnosis difficult, but the long history, the type of patient, the slow progress with a tendency to a wide distribution give the clue.

Syphilis is readily differentiated from cancer. The presence of other syphilitic lesions, the history, and the Wassermann reaction indicate the correct diagnosis; but when cancer is grafted on an old syphilitic lesion the diagnosis may be difficult and can only be settled by the aid of the microscope.

Benign or simple tumours are recognized by their appearance, their situation, and slow growth. These tumours are usually removed by intralaryngeal methods, and if the section for microscopy in any way suggests malignancy a more extensive operation can be done. Occasionally a malignant tumour has been labelled by the section to be benign, or a papilloma has recurred and has become locally malignant.

Sarcoma of the larynx is fortunately very rare. I have only seen two cases, both in young adults. The tumours were smooth, sessile, globular, and vascular, and occupied the inner surface of the aryteno-epiglottidean fold and ventricular band. The tumours bulged into the pyriform fossa of the pharynx and rapidly increased in size. Chevalier Jackson states that not one true sarcoma was found among 643 neoplasms of the larynx seen at his clinic, and there are only three specimens of sarcoma of the larynx to be found in all the museums of the London medical schools. The diagnosis of sarcoma is completed by exploration and a diagnostic section, and a survey of the literature of such cases shows the tumours to be either round-celled or spindle-celled sarcomata.

The subglottic growth, often found below the anterior third of the vocal cord, cannot be clearly seen by the direct or indirect method of examination. A heaviness in movement or fixation of the vocal cord occurs comparatively early in subglottic growths, but our President, Sir StClair Thomson, has shown that it is undoubtedly a late and unfavourable sign in the manifest cancer. The diagnosis of such cases of cancer should be

made before fixation of a vocal cord is evident. The subglottic growth is more malignant and is quickly disseminated to the cervical lymphatic glands—therefore an early diagnosis is urgent and the "wait and see" policy cannot be adopted.

The directoscope and Jackson's anterior commissure laryngoscope with retraction of the vocal cord outwards now enables us to obtain a better view of the subglottic growth and the subglottic extension of a more manifest growth.

There is still some controversy as to the value of the removal of a portion of the growth for diagnostic purposes. Our President in July, 1922, recorded that in 37 out of 51 of his cases, the diagnosis was completed and proved to be accurate without the removal of a piece for diagnosis. In the remaining 14 cases the diagnosis obtained by a diagnostic section was misleading in two cases. A diagnostic section is a valuable but not an infallible aid to diagnosis, and it should be emphasized that a negative section should be ignored and considered to be useless. The value of a diagnostic section is increased if a sufficiently large and deep portion from the centre of the growth is removed. The whole portion should be carefully sectioned and searched from the surface to the depths and a number of sections made. For mechanical and other reasons, it is frequently difficult to obtain a satisfactory or sufficiently deep piece for section, but we are now better equipped with Jackson's tissue forceps and improved direct laryngoscope. There is an impression that the direct method of examination should be more frequently employed and every opportunity should be taken to make use of it. For example, when an anæsthetic is given for the extraction of teeth as a preparation for operation, information can be obtained by a direct examination.

If the diagnosis is in any way doubtful, a diagnostic section is imperative and hastens the diagnosis. If the wound produced by the removal of a portion does not heal, or if the tumour increases in size, it is strong evidence in favour of cancer. I have never seen any harm arise after the removal of a diagnostic piece, but the picture may be entirely altered and diagnosis made more uncertain in the case of a negative section. No doubt in suitable cases, time will settle the diagnosis, and judicious waiting, with an examination once a week or at even longer intervals, will finally reveal the accurate diagnosis, but patients and their friends are apt to become restive and demand to know whether

it is cancer or not. It is not always expedient to delay by waiting, but there are cases in which it is advantageous to wait and to be cautious. The delay, which should be as short as possible, gives an opportunity to have the teeth and mouth cleaned up. It serves to get the patient in training for an operation and a second opinion can be obtained if desired. It is often useful and expedient to have a second opinion; it increases the patient's confidence in his surgeon and may be helpful.

If these methods of diagnosis fail in a case of suspected cancer, it is justifiable to perform an exploratory laryngofissure with full permission to proceed to a radical operation. Where the growth is obscured by œdema of the mucosa or by inflammatory changes such an exploratory operation is a necessity. It has been done and no harm to the patient has accrued, particularly in those cases in which tuberculosis has been excluded. Exploratory laryngofissure has, of course, been frequently done to ascertain the extent of the growth and to decide whether a partial or complete laryngectomy is necessary.

CONCLUSIONS

1. An earlier diagnosis of extrinsic cancer of the larynx is urgently needed.
2. Time will settle the diagnosis in some cases of intrinsic cancer, and it gives an opportunity to prepare the patient for operation, etc.
3. The direct method of examination is an aid to diagnosis and will ascertain the extent of the growth.
4. A diagnostic section of an intrinsic cancer is a valuable but not infallible aid to diagnosis. Such a section should be made in all doubtful cases.
5. An exploratory laryngofissure is justifiable when all other methods have failed.

DISCUSSION

SIR ST. CLAIR THOMSON (London), President, said (in abstract) that an earlier diagnosis of intrinsic cancer was not likely to be established until the public learnt to consult the medical profession earlier for slight but persistent pharyngeal symptoms, and until the profession was more constantly on the qui vive for this disease in men of cancer age and in women of any age. In regard to intrinsic cancer there should be no lagging in the attempt to establish a diagnosis. A few weeks of vocal rest (even silence), abstinence from tobacco, reduction of the amount of alcohol taken, and repeated examinations were valuable aids in confirming or eliminating suspicion, while the delay gave the opportunity to make other complete investigations. These investigations should include physical examination, covering temperature and weight, a blood examination, every reliable test for tuberculosis, complement fixation tests, and x-ray films, remembering that a positive for *B. tuberculosis* was no

necessary part of a pulmonary or laryngeal lesion. Tuberculosis was more often mistaken for cancer than any other condition. The mistake was less frequent of diagnosing an epithelioma in the larynx as tuberculosis. All neoplasms removed from the larynx should be carefully examined under the microscope, and the larynx should be inspected once a fortnight for the three successive months. In the case of malignant growth (whether indicated or not by the microscope), however completely it was removed it would show a recurrence within that time. If the biopsy reported the growth to be innocent, such a recurrence would almost certainly prove it to be malignant. True subglottic cancers were very difficult to diagnose in an early state, as the symptoms were absent or insignificant until the neoplasm had extended far enough to invade the edge of the vocal cord. It was in such cases, and in all doubtful cases, that an exploratory laryngo-fissure might be justifiable. When the diagnosis remained doubtful in spite of complete investigation and repeated observation and rest to the larynx, a biopsy was indicated; that, however, did not always give a positive finding. It was most useful when appearances suggested an innocent neoplasm or a tuberculous lesion. As Chevalier Jackson had said, "Every adult patient with hoarseness should be considered as possibly cancerous until proved otherwise,"

and particularly when, as Mr. E. D. D. Davis had insisted, the alternatives of pachydermia, tuberculosis, syphilis and simple tumour had been excluded. If the diagnosis remained doubtful, it might be well to advise a middle-aged or elderly subject to submit to treatment by the laryngo-fissure route, sooner than risk the strain of uncertainty and the danger of delay.

DR. PERRY GOLDSMITH (Toronto) congratulated the Section on the papers of Sir StClair Thomson and Mr. Davis. He wishes to remind practitioners that old people could have cancer as well as middle-aged ones. Laryngectomy, he considered, should not be done until the patient fully realized what that operation meant.

MR. J. F. O'MALLEY (London) was influenced by Sir StClair Thomson's insistence on the importance of relying on clinical symptoms in the diagnosis of cancer of the larynx, rather than on information supplied by the laboratory.

DR. R. H. CRAIG (Montreal), referring to the treatment of cancer of the larynx, said that his personal results had greatly improved since employing electro-coagulation and radium.

MR. E. D. D. DAVIS, in reply, emphasized the difficulty of the early diagnosis of a sub-glottic growth.

THE CLINICAL VALUE OF TESTS OF LIVER FUNCTION*

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THE FUNCTIONS OF THE LIVER

DURING the past fifteen years many advances have been made in our knowledge of the normal and pathological activities of the liver. This has resulted in efforts to correlate with more accuracy the clinical findings in liver disease with modern physiological data and to stimulate interest in devising tests for the estimation of the functional efficiency of the liver. In common with many workers elsewhere, my associates in the medical wards and the Gastroenterological Clinic of the Hospital of the Graduate School of Medicine of the University of Pennsylvania, have been especially interested for a number of years in liver function tests. It has been my privilege to have been associated with them in this work from time to time, but my main interest has been to observe the results, not so much from the standpoint of experimental gastroenterology as from that of the clinician, seeking to discover what information of practical value such tests afford in the diagnosis and prognosis of hepatic disorders. It is chiefly from this viewpoint, therefore, that I shall endeavour to consider tests of liver function.

There is probably no organ in the body that

is called upon to perform such varied duties as the liver. The contributions on the functions of the liver made during the past decade, by such workers as Mann, Magath, Whipple, Greene, Bollman, Hooper, van den Bergh, Rous, Masters, Ellmann, Graham, Cole and others, constitute most illuminating as well as fascinating chapters in experimental physiological research. To discuss in detail the varied functions of the liver would take us too far afield, but it may not be amiss to recall some of the more important ones, an understanding of which is essential for the proper evaluation of the tests that have been devised for the estimation of hepatic efficiency.

It has long been recognized that the liver performs important secretory and excretory functions. It is difficult, however, to arrive at a definite conclusion as to which substances are secreted and which excreted. Since the work of Smythe and Whipple¹, it seems well established that the chief secretory products are the bile salts and bile acids that are produced in the parenchymal cells of the liver. Whether bilirubin is to be regarded as a secretory or an excretory product is open to some doubt. Experimental work would indicate that under normal conditions bilirubin is excreted by the liver. Bilirubin is derived from the hæmoglobin of broken-down red cells, a process which is constantly going on.

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In this process the reticulo-endothelial cell system is chiefly concerned. Although the Kupffer cells of the liver belong to the reticulo-endothelial system, the recent work of Mann and his associates^{2,3} confirms the belief that these cells are of little or no importance in the production of bile pigment, which has an extra-hepatic origin, being manufactured chiefly in the bone marrow and spleen. Normally, the bilirubin formed in the reticulo-endothelial system outside of the liver is conveyed to the liver and receives final modification in its passage through the polygonal cells. When the normal production, circulation, or elimination of urobilin is interfered with some type of jaundice results.

Another substance of importance excreted by the liver is cholesterol, a normal constituent of bile and found widespread throughout the cells of the body. The excretion of cholesterol by the liver into the bile is now a firmly established conception, according to Muller⁴, and the remarkably constant level of cholesterol in the blood in health appears to be due to efficient regulation by the liver.

In addition to bilirubin and cholesterol, it is more than likely that many other substances, useless to the body economy or even toxic, that are produced in the intestines or elsewhere, are conveyed to the liver to be excreted by it.

The role of the liver in carbohydrate metabolism is vital. It is the most important factor in the maintenance of the normal blood sugar level. The glucose which is brought to the liver, derived chiefly from ingested carbohydrates and to a lesser extent from the cleavage of proteins, is converted in this organ into glycogen, and as such is stored in the liver. In accordance with the varying requirements of the blood for sugar, the glycogen is then converted into dextrose by an automatic neuro-endocrine regulatory mechanism. The importance of the liver in carbohydrate metabolism was amply demonstrated by Mann and his associates^{5,6} who found that when the liver was removed from dogs, the blood sugar rapidly fell, and that this decrease in blood sugar was accompanied by symptoms identical with those observed in hypoglycæmic shock from the administration of insulin. In view of the important glycogenic function of the liver, it is interesting to note that even in advanced cases of liver disease, hypoglycæmia is by no means the rule. The development of transient hyperglycæmia following the injection of epinephrin or general anaesthesia is added

evidence of the liver's ability to mobilize glycogen.

The liver also exercises an important role in protein metabolism. This is shown by its ability to synthesize urea from ammonium compounds and other nitrogenous products. Bollman, Mann and Magath demonstrated that in the hepatectomized dog urea formation ceases, so that there is a decrease of urea in the urine, and an increase of amino-acids in the blood. With the removal of the liver there is also a marked increase in the uric acid of the blood, indicating that this organ is concerned with destruction of uric acid. These facts explain why in certain diseases of the liver, decrease in the urea of the urine and increase in blood uric acid has been observed.

In addition to these important functions the liver acts as a detoxifying agent. Numerous toxic substances produced in the intestines or elsewhere are carried to the liver and there rendered harmless. Wells⁷ has shown that when various inorganic poisons or alkaloids are brought to the liver the bile salts form with them inert or slowly soluble combinations. The liver is also endowed with a bactericidal function. Bacteria that are brought to it by the portal vein or hepatic circulation, are there destroyed. In this process Opie⁸ believes that the Kupffer cells play an important part as phagocytes, fixing insoluble material and bacteria.

TESTS OF FUNCTION

In an organ that exerts so many important functions, it is obvious that there are many difficulties in the way of devising satisfactory functional tests. Although one function may be disturbed there may be no demonstrable interference with any of the other many functions. The difficulty is further increased by the fact that liver cells are not highly specialized; each cell is apparently capable of performing many functions. For that reason much destruction of liver tissue can occur without seriously impairing the functional integrity of the organ. Mann and Magath⁹ found that 70 per cent of an animal's liver could be removed by operation before fatal hepatic insufficiency occurred, thus indicating the large margin of physiological safety with which this organ is endowed. Furthermore, the liver possesses extraordinary regenerative power and reserve function. This has been well shown by Whipple¹⁰ who found that after one-half of the liver tissue of a dog had been destroyed by chloroform poisoning, within nine days almost

complete regeneration took place. More recently Fichback¹¹ obtained almost complete restoration of liver function within six to eight weeks after one-fifth to three-fourths of the liver of the experimental animal had been removed. He found that this regeneration took place within the remaining lobes, new lobules being formed identical in size and shape with the already existing ones. The process was more a compensatory hyperplasia than a true regeneration. Because, therefore, of this remarkable factor of safety possessed by the liver, as well as its multiple functions, it has been found thus far quite impossible to develop a satisfactory *single* test of liver function. With the possible exception of those which depend upon dye retention, no one test thus far advocated is capable of measuring more than one specific function of the liver.

In the effort to find some satisfactory way of estimating liver function, a large number of varied tests have been employed from time to time. For the sake of convenience, it is helpful to follow the plan adopted by Graham¹² and his associates, who divide these tests into groups according to the particular function of the liver on which each type of test is apparently most dependent. Their grouping is as follows:—

1. Excretion of foreign products—dyes, such as phenoltetrachlorphthalein, phenotetraiodophthalein, bromsulphalein, indigo carmine, etc.
2. Tests dependent upon pigment metabolism, as the icterus index and the van den Bergh, bilirubinuria, etc.
3. Carbohydrate tests: lævulose, galactose and glucose tolerance.
4. Tests dependent upon disturbances of nitrogenous metabolism.
5. Tests dependent upon the power of the liver to detoxify, such as the Widal hæmoclastic crisis.
6. Miscellaneous tests, as for example, bile salts in the blood and urine; fragility of the erythrocytes, blood coagulability, etc.

More recently Beckmann¹³ has added a lactic acid tolerance test.

To attempt a complete discussion of these many tests and a detailed description of their technique would prove unprofitable and burdensome. Our experience coincides with that of most other workers in this field, namely, that the vast majority of these tests have proved of little practical value. The difficulty of performing them is out of proportion to the meagre and uncertain information which they yield.

Some idea of the clinical usefulness of the more important tests may be obtained from a summary of our experiences. During the past five years in our gastroenterological clinic numerous liver function tests have been carried out on over 300 patients¹⁴. These patients represented the varied material encountered in any gastroenterological clinic. Several tests were done on each patient, most of whom were under observation for a considerable period, so that we were enabled to repeat the tests from time to time and to note the way in which they varied in the course of the different diseases studied. After some years of experience we have discarded as unsatisfactory the Widal hæmoclastic crisis test, the determination of the coagulation time of the blood, indicanuria, phenoltetrachlorphthalein, phenotetraiodophthalein, dextrose, galactose, and lævulose tolerance tests; determination of the appearance time and the collection of dye by means of duodenal tubes; and the qualitative van den Bergh reaction. We have failed also to learn anything of profit from such metabolic liver tests as the combined blood and urine studies for the retention and excretion of sugar and uric acid. In short, we have come to believe that at present the only liver function tests that are of any practical value are:—

1. The bromsulphalein dye test.
2. The estimation of the serum-bilirubin, *i.e.*, the icterus index and the quantitative van den Bergh test.
3. The estimation of the urobilinogenuria.

In our hands bromsulphalein has proved by far the most satisfactory of the dye tests. The original method of Rosenthal and White¹⁵ has been used with slight modifications. In this method, it will be recalled, the dye in doses of 2 mgms. per kilogram of body weight is injected slowly intravenously in a 5 per cent solution of distilled water. Five c.c. of blood are removed from the opposite arm at the end of thirty-five minutes. This blood is centrifugalized and the serum removed. The amount of dye that is retained in the blood is then determined by a colorimetric comparison of the serum with a standard solution. In an individual with a normal liver an average retention of 35 per cent of the dye has been found in the serum at the end of five minutes after injection; normally not over 50 per cent of the dye should be retained. Thirty minutes after the injection the serum should be practically free from all traces of the dye.

From our series we came to the conclusion that the retention of bromsulphalein is valuable confirmatory evidence of liver dysfunction, and is particularly useful in those cases of liver disease not associated with jaundice, especially portal cirrhosis. When jaundice exists, dye retention invariably is present.

The icterus index is a quantitative estimation of the bile pigment in blood serum. This test was first introduced by Blankenhorn¹⁶. In our studies the icterus index was estimated according to the method of Bernheim¹⁷. The test consists in removing 3 c.c. of blood from a vein. The serum is removed and comparison is made of the amount of bile pigment in the blood serum, with an arbitrary colour standard in a microcolorimeter. Hemolysis and discolouration of the serum from carotinæmia or hæmoconia are said to be sources of error in this test. It is our experience that these changes occur so infrequently as to be negligible. It is generally agreed that the normal icterus index ranges from 4 to 6, that figures between 6 and 15 are indicative of latent jaundice, and readings above 15 show clinical icterus. In our hands the icterus index has proved simpler and just as accurate a method of estimating the blood serum-bilirubin as the quantitative estimation of van den Bergh. Since the icterus index is an accurate method of estimating the amount of jaundice present and noting any slight variations in it, this test is of value both diagnostically and prognostically.

The van den Bergh test is another method of estimating qualitatively and quantitatively the bilirubin in the blood¹⁸. It depends upon variations in colour change that result from the addition of Ehrlich's diazo reagent to blood serum. The intensity of the reddish violet colour that results depends upon the amount of bilirubin present. Two types of reaction are described, the qualitative and the quantitative. Variations in the qualitative reaction, depending upon the degree of colour change and the promptness of its development, occur in four ways. The prompt, or immediate reaction characteristic of obstructive jaundice; a delayed reaction or indirect reaction, indicative of hæmolytic jaundice; a negative reaction; a biphasic reaction.

In complete obstructive icterus an immediate direct reaction will be obtained; in hæmolytic icterus an indirect or delayed direct reaction is present. In the large group of cases in which difficulty in diagnosis exists, namely, cases of partial obstruction or hepatitis, any type of

reaction may be present. Certainly the *qualitative* van den Bergh test cannot be depended upon to diagnose the variations or types of jaundice.

The *quantitative*, or indirect reaction, however, by which the amount of bilirubin in the blood serum can be estimated, is comparable in value to the icterus index, but the information derived from it is no more reliable than that obtained by the latter test. The van den Bergh, on the other hand, is the more cumbersome test. The quantitative van den Bergh, in addition to measuring the amount of bilirubin in the blood serum, is capable of recognizing hæmolytic jaundice and latent icterus. The quantitative van den Bergh is expressed in terms of bilirubin units, an arbitrary unit introduced by its author, indicating an arbitrary amount of bilirubin in the serum equal to a dilution of 1 to 200,000, or 5 mgms. of bilirubin per litre.

The presence of urobilinogen in the urine may be recognized by the addition of 4 or 5 drops of Ehrlich's solution to 5 c.c. of urine and leaving it in the dark for fifteen minutes. When a positive reaction occurs a distinct pink or deep red colouration appears. A satisfactory quantitative method of estimating the amount of urobilinogen was developed by Wallace and Diamond¹⁹. Their method is a dilution test, dependent upon Ehrlich's aldehyde reaction. The result is expressed in terms of the greatest dilution of the urine in which the pink colour is present. Urine giving a colour in dilutions greater than 1 to 20, is looked upon as abnormal. To appreciate the value of this test in estimating liver function one must bear in mind the way in which urobilinogen reaches the urine. Normally it is present in the urine in exceedingly small amounts. Bile pigment in the form of bilirubin passes through the bile ducts into the intestines, there to be converted into hydrobilirubin, which then becomes stercobilin and urobilinogen by the action of bacteria in the intestines. As an oxidization product of urobilinogen, urobilin is produced which is absorbed by the intestines, carried by the portal system to the liver, where it is again utilized in the formation of bilirubin or is removed from the circulation. When the liver is sufficiently damaged, the liver cells are unable to utilize the urobilinogen which is brought to them from the intestinal tract; it is, therefore, passed into the blood stream to be eliminated through the kidneys. Hence, the occurrence of this substance in abnormal quanti-

ties in the urine when the functions of the liver are seriously disturbed. Urobilin may also be found in fresh urine, but in small amounts, when serious pathological conditions of the liver exist. It is never present in normal urine. Our experience with the quantitative estimation of urobilinogen leads us to believe that it is probably the most delicate single test for liver dysfunction. It is always increased even when injury to the liver parenchyma is slight, or when excessive blood destruction has brought about an increase in bile formation. In some instances a significant increase in the urobilinogen has occurred long after clinical evidences of liver disease have disappeared.

Although in our hands thus far the galactose and *laevulose* (fructose) tolerance tests for hepatic function have not proved of much value, the enthusiasm with which these tests are advocated abroad would indicate that they are worthy of more thorough study and trial. For that reason we are employing them whenever opportunity presents itself. Davies²⁰ and R. Bauer²¹, in particular, as well as other European observers, believe that these two tests are valuable in the differentiation of mechanical jaundice from icterus the result of disease of the liver cells themselves.

The new lactic acid tolerance test of Beckmann above referred to, would seem to fall in the same category. He injected 20 c.c. of a two-tenths normal sodium lactic solution. Specimens of blood were then withdrawn at 5 to 15 minute intervals, and the lactic acid content determined. He found an almost immediate withdrawal of lactic acid from the blood when liver function was normal. Beckmann believes that the test is more delicate than galactose, urobilin or dye excretion tests, and that it is chiefly of value in differentiating between jaundice due to hepatitis and that which results from obstruction. The test merits careful investigation, but requires more extensive trial before it can be properly evaluated.

Another newer method of estimating liver function that deserves mention is Aldrich's²² attempt to devise a quantitative method of estimating bile acids in the blood. For this purpose she used a Pettenkofer test. It has long been recognized that the liver cell is the site where the bile acids are produced. Therefore, it has been thought that if a method could be found for determining their presence quantitatively in the blood additional light might be

thrown upon liver function, and more accurate differentiation made between the various types of jaundice. Thus far it can hardly be said that Aldrich's results have proved entirely convincing.

It is impossible for us to speak with any assurance in reference to the newer tests just alluded to. Considerable experience with the older methods has led us to place our chief reliance in testing liver function upon three tests: (1) retention of bromsulphalein; (2) the increase of bilirubin in the blood serum; and (3) the increase of urobilinogen in the urine. These tests are not unduly complicated, can be readily carried out in any well-organized clinic, and furnish information of diagnostic and prognostic value that justifies their use. Such information of clinical value as these tests have yielded in our hands is best illustrated by summarizing our findings in certain groups of hepatic disorder.

In the cases of portal cirrhosis with ascites 87.5 per cent showed an abnormal delay in the elimination of bromsulphalein. As is invariably the case, the dye retention was always greater when jaundice was present; 66.6 per cent showed a definite increase in serum bilirubin, but the icterus index was never over 26, and averaged 14. The most striking increases were found in the urobilinogen, which occurred in practically 90 per cent of the cases, and was at times as high as 1-500. Our experience corresponds with the general belief that in portal cirrhosis definite dye retention and marked increase in urobilinogen is the rule. These evidences of hepatic insufficiency became more marked as the disease progressed. As Greene and his co-workers²³ have shown, the degree of dye retention bears a definite relationship to the amount of ascites.

In the cases of portal cirrhosis without ascites that have been studied, a slight dye retention was observed in about 33.3 per cent. Bilirubin was never increased in the blood serum, but in two-thirds of the cases definite and persistent increase in the urobilinogen was noted.

In a small group of chronic hypertrophic obstructive biliary cirrhoses, definite retention of bromsulphalein was observed, and obviously the icterus index was high. In both these tests, the values obtained fluctuated with the jaundice. Although urobilinogen was increased the increase was never so marked as in portal cirrhosis.

In a number of cases of non-haemolytic jaundice these functional tests have been applied. In the cases of obstructive jaundice the degree of

dye retention and the increase in the serum bilirubin became more marked as the obstruction became greater and the jaundice deeper. The urobilinogen was also increased as the obstruction progressed, up to the point when complete obstruction had taken place. When this occurred, urobilinogen disappeared from the urine. The explanation for this is obvious, when one stops to consider that its formation depends upon the presence of bilirubin in the intestinal tract. After the obstruction was removed, although the serum bilirubin and dye retention gradually decreased with the disappearance of jaundice, urobilinogen again appeared in the urine in moderate quantities. In the cases of chronic obstructive jaundice when the obstruction was removed the last test to return to normal was the urobilinogen, which persisted for long periods of time after the other evidences of hepatic insufficiency had disappeared. We have interpreted this as an indication that the urobilinogen remained increased as long as a residual hepatitis was present.

In the cases of simple catarrhal jaundice, dye retention and an increase in the icterus index paralleled the degree of jaundice. In the early stage of catarrhal jaundice, the urobilinogen was moderately increased. When the jaundice reached its height, urobilinogen had either entirely disappeared or was present only in the faintest traces. On the other hand, as the jaundice subsided, urobilinogen reappeared and reached its highest value, declining so slowly that we frequently found that after all evidences of clinical icterus had disappeared there was still a definite increase in the urobilinogen, this increase persisting in some instances for months. This persistent urobilinogenuria seems in all likelihood due to a residual hepatitis. From our experience in these cases of jaundice, it would seem that urobilinogen is the most sensitive and the most valuable index of injury to the liver parenchyma.

We have had an opportunity of studying fourteen cases in which jaundice resulted from the use of organic arsenic preparations. In this type of jaundice it was found that the onset of the icterus was exceedingly insidious, and its duration and the amount of liver dysfunction very variable. In all cases studied we found a definite dye retention and increase in the icterus index and urobilinogen, but it was noted that the degree of dye retention and the increase in the icterus index were never so high as are observed

in obstructive or catarrhal jaundice; nor was the urobilinogen increased to the same degree as occurs in the cases of cirrhosis associated with jaundice. In these arsenical cases retention of the dye remained disproportionately high and persisted long after the serum-bilirubin was normal. From the liver functional tests and other observations which we were able to make on these cases, we are inclined to believe that the jaundice following the use of arsenical preparations is associated with a true hepatitis, and not merely with a cholangitis.

We have studied a small group of cases of late lues with positive Wassermann reactions who had never received any arsenical preparations, and had no evidence of liver disease. In this group it was found that in 37.5 per cent a slight degree of dye retention occurred; in 75 per cent the icterus index indicated latent jaundice; and in a like number there was a definite increase in the urobilinogen. The result of functional liver tests in this group, suggested strongly that, even though there was no gross indication of liver disease, some hepatic dysfunction existed.

In a group of cases suffering from carcinoma of the liver it was found that, regardless of the amount of liver parenchyma involved, there were no obtrusive evidences of liver dysfunction, as indicated by liver function tests, until definite biliary obstruction had taken place. The insignificant evidences of liver dysfunction in these cases is only another example of the tremendous compensatory power of unaffected liver cells and emphasizes the fact that functional liver tests are useless in focal lesions; diffuse lesions of the liver cells are necessary before they are positive.

In a small group of cases with diabetes with some hepatic enlargement, the functional tests which we employed showed no consistent evidences of impaired liver efficiency, except when for some reason, such as gall stones, biliary obstruction took place. In chronic cholecystitis *without stones*, and without biliary obstruction, the liver function tests failed to show any evidence of hepatic insufficiency. In the cases of chronic cholecystitis *with gall stones* liver dysfunction was only evident in those instances where jaundice was present. In chronic passive congestion of the liver due to cardiac decompensation a definite increase in urobilinogen was the only constant evidence of liver dysfunction to be found.

In another group of cases in whom a long period of chronic constipation was the chief

complaint, associated with toxic symptoms, popularly said to be due to hepatic insufficiency, by no liver function test was even slight evidence of hepatic dysfunction to be found.

CONCLUSIONS

We are led to conclude from our experience with liver function tests, as applied to a considerable group of patients suffering from various disorders, that the three most practical and clinically useful tests, are (1) the retention of the dye bromsulphalein; (2) the estimation of the serum bilirubin, particularly, the determination of the icterus index; and (3) the occurrence of urobilinogen in the urine.

The retention of bromsulphalein is not an early indication of liver dysfunction. The degree of retention is a helpful indication of the extent of liver damage. When dye retention occurs other liver functional tests are also positive, but we have not observed any noteworthy degree of bromsulphalein retention when the ordinary clinical evidences of liver disease were not present.

The estimation of the serum bilirubin is a more useful test of liver function, since it frequently indicates the presence of a latent icterus before liver disorders can be recognized by clinical signs, and the persistence of bilirubin in the blood after all other evidences of liver disease have disappeared.

In our hands an increase in the urobilinogen is the most delicate test of impaired function. Urobilinogen is increased even when damage to the liver parenchyma is exceedingly slight. It is persistently increased so long as any residual hepatitis remains, and it is the one test which has been positive in a certain number of cases in which liver disease was suspected but could not be proved clinically.

Because of the liver's multiple functions and because of its extraordinary compensatory capacity and remarkable ability to regenerate, it

must be admitted that from the standpoint of the clinician who is seeking some means whereby impaired liver function can be recognized, before gross clinical evidences of liver disturbance appear, the tests for liver function that are available at present have hardly justified our earlier expectations. This is the more true because in all focal lesions of the liver, especially those without biliary obstruction, functional tests yield no useful information. They are, however, of some help in differentiating the various types of jaundice and in the diffuse disturbances of the liver, in which by means of them we are enabled to estimate with some degree of accuracy, the extent and duration of the liver damage, so that they are undoubtedly of prognostic value.

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TWO TASKS FOR SCIENCE.—An inspiring presidential address was delivered by Dr. Herbert Levinstein, of Manchester, to the Society of Chemical Industry at their Birmingham meeting. Dr. Levinstein's theme was the full employment of Nature's bounty. The age of coal, on which so much prosperity had been built, was passing; it would have lasted, when it was over, for a shorter period than the Moorish occupation of Spain. By coal and the development of steam the losses of the

Napoleonic wars were soon made good. The losses of the last War could be made good by learning to use more effectually for industry the natural forces around us. It was becoming a matter no longer of choice but of necessity for the human race to bring the air, soil, and sun into its service, to make the earth more productive of food and raw material. This was one of the two great tasks of science. The other was to diminish human suffering by the conquest of disease, which would follow upon an increased knowledge of the living cell.

THE SIGNIFICANCE OF LIMPING IN CHILDREN*

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THE writer has frequently been asked by students for such text-book references as would deal with the general symptom of "a limp." The failure to find such references co-ordinated into a single study has been the motive for presenting what follows.

The normal gait of a normal person is an example of the perfect synchronism of balanced body mechanics. It demands that the bony skeleton should be bilaterally equal in the length and in the relations of the several components. It requires that the joint surfaces move with smoothness through a normal range of motion without restriction and without pain. Finally, the muscle must be properly and rhythmically innervated. Disorganization of any of these factors will result in a disordered gait. The significance of such a symptom therefore requires painstaking analysis. Careful history-taking will show it to be either congenital or acquired, and, further, whether it is chronic and continued, or acute and interrupted. Physical examination will elaborate it as being due to mechanical inequality of bone and muscle, defective innervation, or the reaction of muscle to inflammation in a neighbouring joint. The scope of this examination will progress from spine to toe. The instruments for comparison will be the other limb, if that is unchanged, the tape-line, the examiner's eye and fingers, and, most important of all, the parade of the patient in his birthday costume.

From such observation we may form an opinion as to whether the limp is a *painful* or a *painless* limp. The latter will include several factors or varieties. The functional limp, affected by the neurotic older child by way of imitation, or for purposes of sympathy, will defeat itself by its exaggeration, its variety or its intermittent character; it does not run true

to form. Flaccid limps most often associated with the lesions of anterior poliomyelitis vary with the groups of muscles affected. The distinctive feature is the want of control over certain movements and exaggeration of the action of other groups of muscles.

The spastic limp gives a gait that is forcible and jerky, and is exaggerated when the child is hurried in its walk. The mechanical limp, when due to the leg being shorter than its fellow, produces a sinking movement. If the relationship to the pelvis is altered so that the leg is abducted, then the walking is done on a broad base with a type of "artificial-leg" swing to the advance. Fixed adduction of the limb causes the whole body to go through a corkscrew evolution which displaces pelvis and spine laterally, in order to produce a parallel pair of limbs. The motion is most distressing in its appearance.

From a clinical standpoint, we first decide that the particular limp before us is painless, and then proceed to determine whether it is of bony, muscular, or nervous origin. We may classify painless limps as follows:—

1. *Congenital defects.*—(a) Congenital dislocation of the hip; (b) coxa vara; (c) absence of one of the leg bones.

2. *Lesions of the nervous system.*—(a) central:—Little's disease, birth trauma; (b) peripheral:—anterior poliomyelitis, neuritis; (c) spina bifida with motor nerve defect.

3. *Acquired deformity.*—(a) Old fractures with shortening, mal-union, non-union; (b) dislocations; (c) healed inflammations, e.g., bony ankylosis of tuberculosis.

The waddling gait in a congenital dislocation of the hip is recognized and distinguished as being bilateral, or unilateral, and is confirmed by noticing the contour of the hips. Trendelenberg's sign may be determined, but is not essentially diagnostic, and the picture is completed with an x-ray examination.

* Read at the annual meeting of the Ontario Medical Association, Toronto, May, 1930.

Alteration in the angle of the neck of the femur indicates coxa vara of rachitic, congenital, or traumatic origin. The last results in a painful limp. The true limp from unequal length of the leg or thigh after shortening due to malunion is determined by measurement. The presence of an occasional non-union with pseudoarthrosis is evident to the eye.

The uncontrolled leg or foot bespeaks a nerve lesion, and neurological examination will differentiate it into an upper or lower neurone lesion. The latter suggests poliomyelitis, and a diligent and careful examination will distinguish the groups of muscle from buttock to feet which may have suffered. Other lesions of the central nervous system due to birth trauma and hæmorrhage, or the after effects of bacterial or toxic inflammation, contribute to muscle imbalance and a resultant disturbance of gait. Throughout this investigation our attention is directed mainly to the matter of there being a flaccid or a spastic gait, and the examination of the limb for signs of neuro-vascular dysfunction, coldness, mottling, and other trophic signs. Spina bifida occulta, when found by x-ray examination, may explain certain peculiarities of gait that are presented in the young child just beginning to walk. The mother notes that there is an indefinite "something" wrong. The child does not walk entirely and evenly balanced. This occurrence means that some of the lower spinal roots are functionally imperfect because of the arrangement and distribution following this congenital fault. The gait is a continuation of the "side-wheeler" type of progression of the earliest steps. Generally, the whole leg is abducted and the foot everted and the forward swing is faulty.

Another limp of the painless variety is that due to complete fibrous ankylosis incident to the healing of a tuberculous joint. The antecedent history will show it, at some time, as coming within the group of painful limps. These we shall now consider.

In the case of painful limps the outstanding clinical phenomenon is *muscle spasm*. Its importance in the extremities is not less than the spasm of the right rectus in acute appendicitis, the intercostal spasm of pleurisy, and the sternomastoid spasm in rheumatic torticollis.

How does this spasm arise? The abdominal cavity and a joint cavity have similar character-

istics of histological structure, and each responds to the instant action of inflammation by exudation of fluid and the production of the viscerosensory reflex. In the joint the presence of an inflammation will irritate its sensory nerve. This in turn stimulates the brain to put the guardian muscles of the joint into a protective spasm that will restrict movement, and that will give the joint its position of greatest capacity. Forced motion that disturbs this position of natural protection will have its response in violent, painful contraction, or, in other words, a limp, when walking is attempted.

If the process of muscle contraction is long continued it evolves into a contracture with atrophy. This sign is most important and when present means pathological change in the joint over which the muscle passes.

In observing the gait of a child with a painful limp, we see it as a hurrying gait. The foot is on the ground the minimum length of time required to take the step, and, further, the heel is not placed flat and the other joints are held semi-flexed.

In pursuing an orderly sequence of investigation, we consider the possible causes of painful limps and find them to be due to (a) trauma, recent and acute or chronic, with or without infection; (b) inflammation, acute or chronic of bacterial or non-bacterial origin; (c) tumour.

The pathological lesion in each may involve the several structures from skin to bone:— skin, subcutaneous tissue, muscle and tendon, bone and periosteum, joint capsule or internal structure; and this condition may occur in each of the several segments from spine to foot.

The impulse to the spasm of trauma is the presence of active irritation, due to a rupture of muscle bundle, tearing of ligament, or damage to synovial sac or inter-articular cartilage. Muscle injury shows pain on contraction; a ligamentous tear is painful when stretched; and the injury to the joint structure causes resistance to movement in one or all directions especially when the stage of arthritis is approached. Always there is a point of localized tenderness on pressure and this point directs us to the particular anatomical structure which has suffered.

In case of recent trauma our circumspection travels over each segment below the waist line and considers the possibilities of injury:— (1)

to the bone, especially of the epiphysis; (2) to the periosteum; (3) to the joint, either in the derangement of the internal mechanism or the extra-articular adnexa; (4) to the muscle body or its tendinous insertion.

The history and physical examination usually leads to the source of minor troubles. Dislocations in the lower extremity seldom occur in children. There is one exception, that of the patella in knock-knee, and while this is responsible for sudden falls it is not continuously painful.

Gross fractures are too disabling to come within the category of limps, but the child with a *sprain* is under suspicion and remains so until there is a full investigation of each of the epiphyses about the suspected joint. A childhood sprain is most often a slipped epiphysis.

If the limp points to the hip there are two possibilities, a longitudinal fracture of the neck, and a partial separation of the capital epiphysis. The upper epiphysis of the femur usually unites with the shaft at the age of about seventeen to twenty years. In childhood, the epiphysis is cartilaginous and resists strain better than the weaker neck, and fracture in a longitudinal line is more frequent. In later adolescence the epiphysis separates under strain, but there is not often at first a complete separation. This occurs in the type of the fat girl or the lanky boy, each of whom may be suspected of some endocrine disturbance. The accident seems to follow forced abduction, extension as when attempting the "splits" or taking three stair-steps at a time. Separation of the upper tibial epiphysis occurs, and likewise that of the lower extremity of the same bone, in both of which a moderate lesion may cause a limp, and be diagnosed as a sprain.

The trauma of the foot causing the earliest limp is a periosteal bruising, or a "stone bruise". Painful flat-foot, or more properly foot-strain, is a cause of limp and may be present soon after the beginning of walking, or may be seen after puberty. At this latter age there may be also a claw-foot, due to unequal growth of bone and muscle which will cause a cramping gait, but not exactly a limp.

Again, regarding traumas, any joint from hip to tarsus may react to simple repeated injury by increased synovial exudation, as when its surfaces are driven forcibly together. This in-

creased synovial fluid requires greater space within the joint, and hence the normal flexion is increased. Any attempt to straighten it is at once met with spasm of some guardian muscle, and a limp results. Step-dancing, gymnasium-floor work, hard court tennis, jumping or skipping, may so result.

In considering the after effects of any disalignment through a fracture, we recall that the weight at bearing follows a line through the hip joint to mid-astragalus. Whenever this results in undue pressure on the joint-bearing surfaces then a similar traumatic synovitis of a chronic type may result, and will exhibit itself in a more or less evident limp, especially when the child is tired.

Painful limps of inflammatory origin are of supreme importance from the standpoint of early diagnosis and consequent ultimate prognosis as to function or even life.

The severity is greatest when farthest from the surface and when exudate under tension is concomitant with the infective process. Thus osteomyelitis is placed in the front rank of those conditions requiring our most painstaking efforts toward an early diagnosis. It is fitting that we should pay tribute to the memory of the late Dr. Clarence L. Starr for the emphatic and lucid elaboration of the principles of diagnosis of this most insidious and destructive disease of childhood. Likewise it is a pleasure to recall to memory the extensive experimental work carried out by his associates, to perpetuate and extend the knowledge of the condition. These men and their work are known to all and their continued contributions have earned them the gratitude of physicians throughout the world.

The storm signal of osteomyelitis is a limp—severely painful, and associated with fever. Its occurrence in the lower extremity is about in the following order of frequency:—(1) *tibia*: (a) posterior aspect of internal lower surface; (b) anterior internal aspect of upper end; (2) *femur*: (a) anterior internal aspect of neck; (b) posterior popliteal surface; (3) *fibula*: only very occasionally.

The essential change is a destructive process at the metaphysis adjoining the epiphysis; hence the condition is too often diagnosed as "rheumatism" by the doctor, or as "growing pains" by the parent. Epitomizing Dr. Starr's article in the Sir Robert Jones' Birthday

Volume, the clinical picture is an illness with abrupt onset, pain, severe in type, not in the joint but *near* it, in the bone, and over the epiphysis; tenderness on pressure at this point, which someone has called "two-finger rheumatism", from its distance from the joint line; fever of 103 degrees or more, with a corresponding pulse; leucocytosis of varying intensity; and, above all, a very sick and toxic child. The negative evidence is the failure to find at first signs of local heat and swelling, and the entire failure to demonstrate lesions by x-ray examination.

The differential diagnosis is not always easy in the time permitted for safe procedure, and includes rheumatic fever and septic arthritis as intra-articular causes, and cellulitis as an extra-articular cause. Certain conditions in the shaft may simulate osteomyelitis, *i.e.*, periostitis, subperiosteal abscess, and osteitis. In none of these is there the urgency of osteomyelitis, but when in doubt the safest plan is to provide drainage by incision and drill holes or window openings in the medulla.

Still confining our attention to bone, we may consider the possibilities of a group of conditions that are milder in their manifestations, and are associated at first with transient and irregular clinical symptoms. These centre round some nidus of ossific development and can be comprehensively grouped as disassociation of growth, in the change from cartilage to bone, and due possibly to a low-grade infection. We may come upon a diseased os calcis, a tarsal scaphoid, a tibial tubercle, or the femoral head. Radiographic assistance will assess their relation to the subjective complaint. The "limp" factor is due to the inflammatory process, which results in an osteochondritis, an exudate into the synovial cavity of the proximal joint, a relaxation of those ligaments and muscles attached to these irregular bones, and in such manner brings about painful weight-bearing and motion.

The majority of limps of inflammatory joint origin are localized in the hip. The most frequent conditions are:— (1) tuberculosis in either the pre-arthritis or later arthritic stage; (2) pseudo-coxalgia (known also as Calvé-Perthes', or Legg's disease); (3) arthritis, tuberculous or septic; (4) adolescent coxa vara.

Differential diagnosis is extremely difficult and

is not immediately possible in early cases. The age incidence is important, and on this I quote from Platt. "Broadly speaking, a persistent hip lesion in a child under five is likely to be a tuberculous arthritis; between the ages of five and ten, pseudo-coxalgia is at least as common as tuberculous arthritis. In the second decade, tuberculous hip disease becomes a comparatively rare lesion, the characteristic affection at this age period being traumatic coxa vara. At all ages a transitory arthritis, due possibly to trauma or low grade infections, may be seen."

The points of differential diagnosis which will indicate the presence of adolescent coxa vara are—a history of trauma with a painful limp that has persisted for weeks, and finally the estimation of the degree of joint movement. The trochanter is prominent and raised; thus there is a shortening, the leg lies flat on the table and is not flexed as in tuberculosis. It tends to outward rotation rather than inward, and there is not the same encouragement for abduction. Naturally, during slipping of the epiphysis, there is severe spasm and likewise during the subsequent arthritic reaction. The x-ray picture in this will lead quickly to the explanation of the condition. However, neither in tuberculosis nor in pseudo-coxalgia will the radiograph be of any early help, and the case must here rest on clinical findings. Steindler says it takes two years to establish a confirmed diagnosis of tuberculosis in a joint. However, one may say that the more pain there is, the more likely is the condition to be due to tuberculosis.

Abduction and rotation are the early movements to be limited in both pseudo-coxalgia and the pre-arthritis stage of tuberculosis. In neither case will the other foot come into play to effect immobility of the limb, as is seen in rapidly developing tuberculous arthritis. Six weeks' fixation while awaiting diagnosis will improve a pseudo-coxalgia, but not to the same degree if we have a tuberculous joint. Our tuberculous hips that make splendid recoveries are often Perthes' disease. A von Pirquet test may be of some help but its uncertainty is well known. Just here one may point out that tuberculosis may follow trauma, but never directly. The original traumatic limp may seemingly recover in the interval of six weeks before tuberculosis becomes active. Eventually, in the differential diagnosis of tuberculosis and pseudo-coxalgia we

rely on the x-ray to confirm our earlier clinical diagnosis. In such suspected tuberculous joints, where one resorts to operative measures to effect a quick ankylosis, opportunity is offered for biopsy and animal inoculation as a method of certain diagnosis.

Inflammatory conditions in other joints below the hip occasionally are the cause of limps, as in a tuberculous knee characterized by a persistently raised surface temperature over a swollen joint, whose early tendency is to posterior luxation. A case of congenital syphilis showed a knee-joint swelling, but its association with a "sabre" shin made the clinical diagnosis possible. True rheumatism, with flitting pain, is possible of fairly certain diagnosis within a week.

And now must be categorized a series of other conditions which may result in a limp. In the bursae there may be enough inflammation to extend to, and cause a spasm of, the muscle to which the bursa serves as a buffer; so we may be directed to a great trochanter, the pad of fat below the patellar ligament, or that below the tendo Achillis or beneath the os calcis. There

may be an inflammatory condition about the insertion of a tendon, especially at the heel and the knee, with exudation and scar tissue. Much has been written since the advent of influenza about the subsequent condition of fascitis, myofascitis, fibrositis, or peri-tendinitis, to use some of the terms applied by various authors. Finally, the skin and subcutaneous tissues may have their infections and communicate their irritant reaction to deeper muscle, and so cause spasm and a limp. During this past winter several cases of glandular suppuration along the saphenous chain were sequelæ of influenza and were brought to clinic because of a limping gait.

One of the greatest tragedies in childhood is the occurrence of bone tumour of malignant tendency. The earliest clinical history is an intermittent limp of minor severity, with subsequent deep soreness, and, finally, the presence of a peculiar tumidity or œdema. The greatest number occur between the ages of 10 and 20. The lower femur and upper tibia are the most frequent sites. Early diagnosis is made when clinical, roentgenological and pathological acumen are co-ordinated.

HEART DISEASE IN PREGNANCY

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IN the normal female pregnancy is sometimes a trying experience but apparently does no direct damage to the circulatory system. In those who suffer from a cardiac disability the results are variable, and depend, for the most part, on the condition of the myocardium and the social position of the individual. Females with every degree of cardiovascular disability become pregnant or wish to become pregnant. If the degree of failure is slight, it is possible for one, two, or perhaps three pregnancies to occur without apparent harm, but if the myocardium is poor even one pregnancy may be the beginning of diminished circulatory efficiency or even of a rapidly increasing failure and death.

During the nine months she is carrying the child, the load which the mother's heart must carry is an increasing one. The cardiac output has to be gradually augmented throughout the period, and the heart itself is increasingly em-

barrassed by the gradual growth of the uterus. The enlarging uterus pushes the heart upward and to the left. In this position it has to increase its output and support the strain of labour at the end of the period.

The physician who is consulted by patients with diseased hearts must be careful to base the opinion he is required to give solely on the facts of the case. In particular, he must not be influenced, or at least not too greatly influenced, by such an extraneous consideration as the wish for an heir. He may have to decide:—

1. Should the patient become pregnant at all?
2. When pregnant should she be allowed to carry on until the end of her term?
3. When and how should the pregnancy be terminated?

If the decision is not based on the history of the patient's cardiac disability and on the findings it is unfair and dangerous for the hopeful mother.

Recent statistics* from the Boston Lying-In Hospital, the New York Lying-In Hospital, and the Robinson Memorial, when combined, show 45,320 deliveries with 480 deaths from all causes and 48 deaths from cardiac disease. This indicates that one mother died for each 100 deliveries and that one in 1,000 parturients died from organic disease of the heart. Such figures, however, only tell of the actual deaths at the time of pregnancy; they do not give any idea of the deaths after leaving hospital or the lifetime of misery from circulatory failure initiated by the pregnancy.

These patients in the child-bearing period have not, as a rule, reached the age for the heart to become damaged by arteriosclerosis or hypertension. We are generally dealing with a rheumatic heart which is the subject of mitral stenosis or of mitral stenosis and aortic insufficiency. The heart failure of such conditions as hyperthyroidism or diabetes, when associated with pregnancy, must be assessed according to the disease itself rather than from the cardiac side of the picture alone. The two most important distinctive factors that will influence our judgment and advice are first, the condition of the heart itself; secondly, the time (in relation to the pregnancy) we see the patient. These two important points will always be interwoven.

In regard to the heart itself, stress will be laid on the degree of enlargement, the presence or absence of auricular fibrillation or other grave pathological rhythm, and signs of failure outside of the heart. It is not necessary to go into details in regard to these, as each patient will present her own problem and she must be judged on what these mean to her in the way of heart failure when considered in regard to her social position or ability to take long periods of rest. The time in the pregnancy at which we are consulted will always influence our procedure. The dangers and possibilities of relief in one period are not those of another, but usually may be clearly seen.

It is often astonishing how well cardiac patients do in their pregnancies, more especially in the first one. When we have to consider whether or not the woman should become pregnant, there are certain findings, such as auricular fibrillation or passive congestion of the lungs or liver, which must preclude a successful outcome. There are other cases, even in the presence of a

large heart and considerable evidence of disease, where one pregnancy may safely be allowed if the patient is able to take prolonged periods of rest on the appearance of any danger signal.

When the patient is pregnant, surgical interference at any time is hazardous. In the first four months, it is true, abortion is comparatively easy and should be done in the presence of progressive failure. In later periods premature labour becomes serious and might easily be more dangerous than allowing the patient to go on to term. Where there is danger these patients should be examined frequently for evidence of a failing heart. If signs of passive congestion appear they should be put to bed at once and given remedies to increase cardiac tonus. It must be taken as a rule that after the fourth month in such cases surgical interference cannot be undertaken; such patients must be carried to term or nearly to term.

In those patients who have shown definite evidence of failure throughout pregnancy the safe method of procedure is Cæsarean section when the child becomes viable, as the mortality rate by natural termination in such cases is high. The uterus then is emptied with little effort on the part of the patient and usually the recovery of the heart is rapid. Patients in whom such a procedure has been necessary naturally should not undertake a further pregnancy, and sterilization is easily done at the time of the operation. In such persons the operation is as much for sterilization as it is to empty the uterus. Patients who, in spite of a bad heart, have gone through the nine months without passive congestion of the lungs or liver might be delivered by the natural route with the aid of forceps. If, however, there is any doubt about which method of termination should be undertaken, then the safer Cæsarean section should be chosen, as it entails less risk to both mother and child.

In addition to the usual complication of a failing heart, there may be other, what might be called minor, disturbances. These are usually disturbances of cardiac rhythm, such as paroxysmal tachycardia or auricular fibrillation. Such pathological rhythms begin with great suddenness and are alarming to both the mother and doctor. In such patients, if the myocardium is apparently normal, there is usually a third factor to be dealt with, such as a severe grade of anæmia or hyperthyroidism. It is usual for the normal rhythm to be resumed after proper treatment.

*REID, *Am. J. of Obstet. and Gyn.*, 19: 63, January, 1930.

A SIMPLE METHOD OF ARTIFICIAL FEEDING IN INFANCY

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RECENT work has focussed attention on simplified feeding in infancy. There are many simple methods and it is not improbable that a too simple method may defeat our purpose by depriving physicians of proper supervision during a period of life when constant watchfulness is important. Paradoxically, one begins to feel that the reason why so many infants do well on complicated formulæ is not on account of the merit of the various formulæ but because of the capacity of the infant to make progress, provided it is supplied with the minimum amount of fat, carbohydrate, proteins, salts, vitamins, and total fluid. We use the word "minimum" advisedly, because if more than this minimum is supplied often there is no apparent harm if each ingredient does not fall below the requisite amount. As a matter of fact, it is since the value of the accessory food factors has been appreciated that we have learned the relative unimportance of the actual food factors, provided always that certain minimum requirements are complied with and that sufficient calories are supplied.

Berlin, the academic home of infant feeding, well exemplifies this argument, for at one end of the town infants do well on protein milk and its combinations and at the other extremity butterflour, under the enthusiasm of Czerny, is with equal success used in the feeding of infants.

The story of our progress in infant feeding at the Montreal Foundling and Baby Hospital during the last ten years is of interest; for with every simplification our results have improved, until to-day we feel that our only remaining physiological problem is that one related with infections, and particularly those upper respiratory infections which are difficult to handle wherever infants are found gathered together. In the autumn of 1928 we decided to try a certain number of the infants on selective feedings or, in other words, to feed them by appetite from the following formula:

Lactic Acid Whole Milk.... 20 ounces
Corn Syrup (50 per cent)... 2 ounces

Our results have been so uniformly successful that it is thought worth while to describe them.

It is well recognized that Marriott has advocated some such feeding but his actual procedure during the first year was not known to us. We make no claim to originality but simply wish to record a simple satisfactory method which we have been using. After our success with lactic acid milk we were encouraged to try the same sort of feedings without acidification, but this work has not progressed sufficiently to justify any conclusions. We have had no experience with Weissenberg's citric acid whole milk. We are continuing our experimental feedings and at the end of another year hope to have more established ideas. In the meantime we submit a method which is simple and workable, although probably no more simple or workable than many others. This work is being carried on at the Montreal Foundling and Baby Hospital and no success could have accrued had it not been for the very efficient co-operation of Miss Lawrence and her capable staff of nurses, for we all know too well that there is no food that can be successfully fed to infants if they are not well cared for.

The caloric value of our standard lactic acid milk is between 23 and 24 calories per ounce, or slightly higher than breast milk, and the carbohydrate and protein both in greater percentages than in breast milk.

Our first rule was that all babies should be fed every four hours (5 feedings in the 24 hours) and for 20 minutes by the clock. Each baby, under 3 months of age was held while being fed. The ordinary anticolic nipple was used with a fairly large hole, so that one could reasonably assume that the infant would get as much as wanted during the 20 minutes.

Our second rule was that when a baby took 32 ounces of this formula in the 24 hours,

cereals were offered twice daily and vegetable broth once, and the number of feedings was reduced to four. When the child was taking two platefuls of cereal it was usually fed only three times a day. This often meant in practice that infants of four months of age were eating cereal greedily, and at six months were receiving only four feedings in the 24 hours. Boiled water was offered to all infants between feedings. The most extraordinary variation in intake was found which will be referred to in the reports.

Cod liver oil was administered to all infants from the day of admission and rapidly increased up to 1 teaspoonful twice a day. Orange juice was also given from admission and quickly augmented to 1 tablespoonful daily.

It may be of interest to note that cod liver oil has never disagreed with an infant in the Montreal Foundling and Baby Hospital, although we venture to affirm that there is no experienced physician who cannot recall cases in private practice which seemed unable to take cod liver oil without gastro-intestinal symptoms.

It is not our contention that every infant will do well on this type of feeding, for it may require minor variations, but then neither will every infant do well on the breast without these minor variations, and we are inclined to believe that about the same percentage will make an uninterrupted progress on either method of feeding, provided always that the technique is good and no parenteral or enteral infections supervene. Neither do we wish to be understood as advocating that all infants should be fed according to appetite. Sedgewick and others have emphasized the variation in the amount taken at different feedings from the breast. Because of this difference no one as yet has suggested milking the mother's breast and feeding equal amounts from a bottle at regular intervals of three or four hours. Whether it is better to make the baby take a prescribed amount at each feeding or to be guided by the appetite must to some extent depend on the type of baby.

Our conclusion, therefore, is that it is perfectly safe to feed normal babies during the first year by appetite on lactic acid whole milk 20 ounces with the addition of 2 ounces of 50 per cent corn syrup, at four hour intervals,

five feedings in the twenty-four hours, and for exactly 20 minutes at each feeding, boiled water being offered between feedings and the accessory food factors supplied in adequate amounts. And furthermore, we are inclined to believe that some such simplified feeding as outlined above is safer to place in the hands of the busy general practitioner than one that requires to be modified at regular intervals.

The following case reports are representative of those of twenty children who up to this time have received the feeding described. Only two infants of the series failed to make satisfactory progress; one had congenital syphilis and the other a cerebral hæmorrhage resulting from birth injury.

CASE 1

Philip W., aged two weeks, admitted December 26, 1928; weight 6 pounds. On discharge fifty-two days later he weighed 9 pounds, an average gain of 7 ounces per week. There was occasional regurgitation, but no vomiting. An upper respiratory infection in February had no effect upon the fluid intake.

CASE 2

Annie M., aged 3 weeks on admission; weight 7 pounds 4 ounces; fifty-four days later she weighed 10 pounds, an average gain of 5.5 ounces per week. Except for one mild upper respiratory infection, her stay in hospital was uneventful. She took from one to seven ounces at a feeding, the duration of which varied from five to twenty minutes. She had two to four pasty stools per day. There was a moderate amount of regurgitation and the record says vomiting occurred seven times during the fifty-four days.

CASE 3

Evelyn W., aged 1 month on admission; weight 7 pounds. In 4 months there was a weight gain of 6 pounds, an average gain of 6 ounces per week. Cereal was added to the diet at age of 3 months. There were no infections, and her progress was uneventful.

CASE 4

Arthur T., aged 2 months on admission; weight 9 pounds 2 ounces. Marked variations in milk intake, which ranged from 21 to 42 ounces per day. No vomiting; very little regurgitation; one to five pasty stools per day. The addition of cereal at the age of 3½ months was coincident with an abrupt rise in the weight curve, but there was no decrease in the quantity of milk taken. During two upper respiratory infections in November and December, she continued to gain weight and to take the usual quantities of milk. During a very severe infection in April formula withdrawn for two weeks. The illness caused a loss in weight of 2 pounds 6 ounces in 2 weeks; this was recovered in the following three weeks. The average weekly weight increment for total seven-months' period was 5 ounces.

CASE 5

Warren T., aged 3 months; weight 8 pounds, a premature infant, admitted at age of 4 days, weighing 3 pounds 8 ounces. He was given an evaporated milk formula until his transfer at the age of 3 months to

the group receiving the special feeding. The weight gain thereafter averaged 7.5 ounces per week. In March, an upper respiratory infection, with otitis media and fever, did not influence the food intake or the weight increment.

CASE 6

Clarette J., aged 3½ months on admission; weight 7 pounds 4 ounces. There was a history of persistent vomiting and failure to gain since birth. The amount taken at feedings varied from two to eleven and one-half ounces. There were two to six pasty stools per day; no vomiting. He was discharged twenty-two days after admission. His weight gain was three pounds, an average gain of one pound per week.

CASE 7

Michael F., aged 3½ months; weight at birth, 7 pounds 14 ounces; a premature infant, admitted at the age of 10 days, weighing 4 pounds 4 ounces. He was given an evaporated milk formula and later a modified cow's milk feeding until his transfer at the age of 3½ months to the group receiving the special feeding. The weight curve immediately showed an uninterrupted rise. The gain for the first month was 1 pound 8 ounces; for the second month 1 pound 14 ounces; and for the third month 1 pound 12 ounces. The average gain was about 6 ounces per week. He took 28 to 37 ounces of milk per day. The chart shows that on February 17th, when he was four months old, the quantities taken at the five feedings were 9½, 6½, 7, 6, and 10 ounces, and the behaviour record for that and succeeding days states that the child was happy and contented. During an upper respiratory infection in February, the patient limited his milk intake for a week, but the 24 hour amount was at no time less than 20 ounces. During this infection and the otorrhoea which followed weight increment was maintained at the usual rate.

CASE 8

Gabrielle L., aged 5½ months; weight at birth 9 pounds 14 ounces, admitted at the age of 5 months, weight 9 pounds; transferred to the special feeding group at age of 5½ months. She gained 3 pounds 2 ounces the first month, 3 pounds the second month and 2 pounds 2 ounces the third month. At the age of 11½ months, she measured 29 inches and weighed 22 pounds 2 ounces, representing an average weekly gain of 7½ ounces over a period of six months. This patient was the most erratic of the series in regard to the quantity taken at a feeding and the 24 hour fluid intake. On the

first day of the experiment she took 42½ ounces of the formula and 8 ounces of water, in addition to two table-spoons of cereal. The quantities of milk taken at the five feedings were 6½, 6½, 10½, 12½, and 6½ ounces. During the second week of the experiment, she had considerable distension, with two or three attacks of cyanosis. In the third week she had four to eight loose yellow stools per day, during which period the special feeding was discontinued. After this time she became more contented, taking regularly an average of about 39 ounces of the formula daily, and crying for half an hour before feedings. There were, however, periods of one or more days when the milk intake would rise to 45 or 50 ounces in the 24 hours, to be succeeded by a more normal period, giving to the graphic record of her daily intake the appearance of a very erratic fever chart. During an attack of acute bronchitis and acute suppurative otitis media in February she continued to gain in weight on an undiminished milk intake.

CASE 9

Margaret H., aged 6½ months on admission; weight 7 pounds 14 ounces; length 22 inches; bilateral purulent otorrhoea. The milk intake varied from 28 to 44 ounces per day. The monthly weight increments were: first month 3 pounds; second month 1 pound 13 ounces; third month 3 pounds 11 ounces; fourth month 2 pounds 10 ounces, giving a weekly average of about 10½ ounces. At the age of 9 months, length was 26 inches. In February there was a recurrence of the otorrhoea in the presence of a rising weight curve.

CASE 10

Walter W., aged 6 months on admission; weight 15 pounds 4 ounces. He took huge quantities of the formula without evidence of discomfort. On four occasions, he took over 50 ounces of milk in 24 hours, and on one occasion drank 13 ounces in 20 minutes, four hours later 9 ounces, and again 4 hours later 12 ounces. During an acute upper respiratory infection, with fever rising daily to 102° F. for a week, he reduced his milk intake to a level of 21 to 35 ounces per day. His average gain per week for a five months' observation period was six and one-third ounces.

CASE 11

Maisie C., aged 7¾ months on admission; weight 10 pounds. Large quantities of the formula were taken in addition to solids. Her average weekly weight gain over an observation period of four months was 9½ ounces.

STERILIZING WATER BY THE CATADYN METHOD OF KRAUSE.—About 50 years ago the Swiss biologist, Carl v. Nägel, made the observation that micro-organisms died in water which was kept for several weeks on end in vessels of silver or copper. He could offer no explanation of this effect, as he was unable to detect the presence of any metal in solution and his experiments precluded the possibility of the germs having been killed by radiation. He called the phenomenon "oligodynamics", and after his death Dr. G. A. Krause, Munich, a physicist, and others, confirmed and extended his observations. The catalytic-dynamic properties of finely divided silver have been utilized in the "catadyn" method of sterilizing water. The effect of minute quantities of the spongy metal distributed over porcelain

rings, beads, or particles of sand on the living organisms in water has been accurately measured; in most instances the colon bacillus has been taken as the test organism. It is claimed that the filtrate also in some mysterious way acquires and retains the germicidal power originating in the materials of the catadyn process. Severe and prolonged critical tests have been applied and the evidence advanced is remarkably convincing. Before it can be applied on a commercial scale the question of expense of materials and containing vessels will require scrutiny, but a *prima facie* case has been made out for the consideration of the physicist, the biologist, and the public health expert. A demonstration of the method before an informed audience would seem to be the next step.—*Science Supplement*, Aug. 1, 1930.

THE CARE OF THE HANDICAPPED*

BY EDWARD HOCHHAUSER

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OUR work has been limited to the care of the tuberculous. In discussing the problem of rehabilitation of the tuberculous, perhaps, we may indicate an experience that has value in the general problem of rehabilitation. With the tuberculous there is the ever-present danger of relapse, of reactivation of the disease, as well as the exaggerated fear of infection.

A scheme of rehabilitation presupposes adequate medical care. With protracted illness, we have a mental, as well as a physical hazard. A tuberculous patient is not a pair of lungs on legs. If after institutional treatment he suffers from other ailments, if his teeth are in bad condition and neglected, our task is very much complicated. At the time when we are trying to wean the patient from the hospital atmosphere, we must again start sending him for treatment. Waiting an hour or two at the average hospital dispensary is not good mental therapy. If at the sanatorium the patient has had some occupational therapy, group or individual talks on the return to normal life and work, our task is somewhat easier.

The mental attitude of the patient often presents more difficulty than his physical disability. The warning of the late Dr. Herman Biggs is as valuable to-day as it was fifteen years ago, when he said, "We are admitting self-respecting sick men into our sanatoria and turning out healthy loafers." We might add, comparatively healthy loafers. For it is the next three to five years that determines whether the gain at the institution is to be permanent.

What happens after the "san"? Can the patient be returned to his family and community as a normal self-respecting individual? Ask the average business man and he will tell you, "Once tuberculous, always an invalid, and usually chronically dependent." Family welfare workers are apt to go to the other extreme, at least in practice. The man on his return is expected to

again support his family and the relief allowance is either immediately discontinued or radically reduced. The patient refuses to work, complains of many symptoms, or if he applies for work finds all the jobs offered too difficult. He is demoralized, often pauperized. How much of this is the fault of the patient, how much of the sanatorium; how much is it a by-product of the disease itself?

Let us follow the patient, beginning before a diagnosis has been made. He is working regularly and supporting himself and family; symptoms of the disease are ignored or he receives intermittent medical treatment for a long period of time before a diagnosis of tuberculosis is made. Perhaps there has been a short stay at a hotel or boarding house at some health resort.

When the patient enters the sanatorium his savings are gone and the family applies for financial assistance. His disease is fairly well marked, he is considered a second stage case of tuberculosis. From an active life concerned with the welfare of his family he enters the institution where everything is done for him. His chance for recovery is dependent on his ability to enter into the new life. Rest, and more rest, regularity, absolute obedience to institutional regime are essential. Mental rest is stressed. He cannot help his family while he is sick; the community will look after them. We are satisfied that he has been demoralized. There is a conflict between all the elements of cure as he has learned it and the everyday life, which when reminded is kind and sympathetic, but in the bustle demands the maximum return from each member of the community.

Several studies of patients after sanatorium treatment show relapses as high as 50 per cent within a year and a half after discharge. A recent study of graduates of a very large sanatorium maintained by a fraternal organization is even more discouraging. Of the patients home up to five years, 60 per cent were dead.

As with all problems, to understand its extent

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and difficulties is the first step towards solution. A sympathetic appreciation of the problem of "after the san" is essential. I am not urging a sentimental interest. Much harm is done patients by well-intentioned people, who constantly remind the tuberculous that they must be shielded from the cruel world, who preach well and frighten effectively. Often the only real assistance they render is a bottle of milk. The problem is one of gradual readjustment. There are general principles, but the application must be individual. The ideal is to fit the work to the changing physical condition of the patient, to allow the patient to help himself. The man on the street is apt to judge health work by its fruition. Can the patient who has tuberculosis be returned to a normal life and be made economically useful?

The problem is complicated by many facts in the personality, experience and education of the patient, as well as his physical condition. Fortunately a large percentage of the tuberculous make their own adjustments. Where his physical condition is good and the patient gets his own job he is apt to be more successful and the percentage of relapse less than among those we place. He usually secures a job at his old trade with much higher wages than the placement worker can secure, and we know a high wage is one of the most effective cures for tuberculosis.

We find the most difficult patients among those who cannot place themselves. Many were unequal to the competition of the so-called normal life before they developed tuberculosis. Perhaps social workers who are our severest critics, compliment us when they expect that we will secure an abnormal response from this subnormal group. Some of the incompetent and illiterate are unskilled workers because they never had an opportunity to learn a trade. They require trade training as well as physical rehabilitation.

In this paper I will not try to discuss placement and retraining of the handicapped. I would rather discuss the problem of that large number of sanatoria graduates, who, on discharge, are unequal to the full-time job or whose work capacity is uncertain. Many of these patients are permitted to stay at home or forced to enter institutions because the doctor or the social worker cannot secure the work the patient may reasonably undertake. We have a mental as well as a physical problem; we have a breakdown in morale, and perhaps an exaggerated fear of relapse to overcome.

The light out-door jobs are myths for the most part, and where they exist are usually light in pay. Part-time jobs in industry are rare and difficult to secure, although they offer the greatest hope for the successful placement of a large number of patients.

Fifteen years ago, a tuberculous patient in need of sanatorium care was advised that after six months' treatment he could return to work. To-day, we are told that a year at the sanatorium is excellent training and preparation, for it takes three to five years to effect a cure. To lengthen the stay at the sanatorium until the patient's condition is apparently cured would be unwise. It would complicate the problem of rehabilitation more than it would assure ultimate usefulness and well-being, and we know how difficult it is to induce patients to stay nine months. In New York City the average stay at hospital and sanatoria is three months.

For many patients there is a wide gap between sanatorium treatment and normal industry. When our committee started to function, two propositions were considered to meet the need for part-time work. One was an industrial or farm colony and the other a factory in the city. The farm or industrial colony was disapproved of. It would be a costly experiment. The patients would have to be carefully selected and the project would not materially help in the solution of the problem of our urban group. It meant moving the entire family to the country, depriving the children of the associations and the opportunities for study and advancement that the large city affords. The other proposition was a factory in New York, the patient to live at home with his family and to maintain all his normal relationships. Where necessary, the family could be moved to a better apartment, but always to one they could afford when the patient was finally rehabilitated.

To meet the need for graduated work and to determine whether a rounded-out scheme of medical, social and industrial care of the tuberculous might reduce the large percentage of relapses, the Altro Workshop was started in June, 1915. Here the doctor is the "boss" so far as hours of work are concerned. He prescribes maximum hours on periodic examination. It is recognized that the family must be the unit of care to secure maximum results and experience has shown that the medical care of other members of the family is almost as important as the medical care of the patient himself.

A former president of the National Tuberculosis Association, superintendent of an excellent sanatorium said, "If I was asked what one thing I would like to do for the graduates of my sanatorium, I would say, give each one \$5,000 when he leaves." At a recent meeting of a National Committee on after-sanatorium care, the director of one of our largest relief organizations said, "Perhaps the greatest cause of relapse after sanatorium treatment is poverty."

Work is a medium for the reconstruction of mind and body. The realization that he is not destined for the scrap heap is more potent than the medication prescribed and furnished. While faith is an essential element of cure, the patient cannot get well on faith alone.

At the Altro as part of social care, the family is assured the necessary minimum income. Where relatives are not in a position to assist, the patient receives the necessary minimum in his weekly pay envelope. This minimum is made up of cash representing earnings, and a check for the subsidy. The patient is said to be working out well, if in the course of time his hours of work increase, which means improvement physically, and the cash or earnings increase, indicating improvement in industrial effort. As he becomes proficient and his earnings increase, he is allowed more than the minimum which affords a margin of choice and encourages him to earn more. To re-awaken his self-respect, he is treated as a sick man trying to get well and not as a dependent whose desire to work is being tested.

The patient is often skeptical of the altruistic workshop. He suspects its purpose, may at times say it is a scheme to deprive him of the financial assistance his physical disability entitles him to. We believe that the wage scale should be equal to that of the best factory producing the same work.

At the Altro pay is on the task basis and never less than the union wage for similar work. At first, patients do not produce more than one quarter to two-thirds as much as a well worker in the same hours. The patient is working hard, for during the first year after sanatorium treatment it requires greater effort to turn out half his normal capacity.

The scheme of graduated work at the Altro which we have called industrial convalescence, is intended as a hardening process and preparation for work in normal industry. The workshop is not organized or planned as a training school.

The practice is to follow the method that enables the patient to earn quickly and to increase his earnings while "on the job." He is taught to sew on rags, this training period varying from a few hours to two days; then he is given work which requires the least expertness and is slowly graduated through various grades until he is taught the best grade of work for which he seems to have capacity. The patient is paid the union rate as soon as he can produce acceptable work.

The nurse at the factory supervises the patient at work and at rest, for he spends his working day at the workshop resting in-doors or out-doors when not at work. The nurse is literally the welfare worker of the establishment for her concern is always the patient.

In locating the factory we were prompted by two major considerations. First, that it should be a short car ride or walk from a desirable residential district where patients might find an apartment within the rental they could afford when rehabilitated. Secondly, patients living in other sections of the city using elevated or subway trains would ride against the traffic instead of with it, and would probably secure a seat.

The Altro Workshop does not look like an institution. It faces three streets, south, east and west, and 50 feet open space to the north assures light and air on all sides. The equipment, modern throughout, with many labour-saving and fatigue-reducing features, is similar to that found in many ideal factories. A very interesting live steam pressing arrangement which sterilizes also adds to the attractiveness of the garments. Uniform-making, which includes all kinds of washable garments for use in the hospital and hotel, was chosen because approximately half of the patients applying for care had come from some branch of the needle trade. The newcomer begins to earn the second day and when he regains his health he may return to his old trade or continue at sewing where skilled workers can earn a living wage. Unfortunately, present-day conditions in the sewing trade make it more difficult to place factory graduates.

At first only quiescent, negative-sputum cases of pulmonary tuberculosis were accepted. In 1915, phthisiophobia, the exaggerated fear of tuberculosis, was the rule, now it is the exception. The success of the Altro was predicated on its ability to dispose of its output. Most physicians were skeptical as to the possibility of tuberculous patients working indoors and at the sewing trade.

Economically and medically, it was wise to go slowly so as not to complicate the many problems of starting a workshop for the tuberculous, hence we limited the intake to negative-sputum, inactive cases.

As the workshop progressed, more advanced negative-sputum cases were admitted. During the war, a study disclosed that a very large percentage (in one month 50 per cent) of the patients leaving or discharged from a large sanatorium had positive sputa.

The workshop, very busy making blouses for the United States Navy, was exceedingly careful, going to the extreme of discharging any patient whose sputum became positive. To meet the need of positive-sputum patients, an annex factory was established in 1918. Because of the problem of disposing of their work, it was thought advisable to separate the two groups, but a year later they were merged and housed in the main workshop. The admission of positive sputum patients was stimulated by the criticism of a captain of the United States Public Health Service, who is now assistant to the Surgeon General.

"In 1918, and since then," to quote from a study made by the National Tuberculosis Association, "The incipient, moderately advanced and advanced cases have been employed, which included patients who showed some activity of their pulmonary lesions, a few cardiacs, a fair number of asthmatics, some chronic bronchitics, besides some suffering from bronchiectasis. While the investigators have found it impossible to list the exact number of neurasthenics, or chronically institutionalized persons, the study has convinced them that the Altro has cared for a large group of these most difficult of all types to treat and rehabilitate."

There are a large number of patients in need of permanent sheltered employment who, because of extensive tuberculosis or complicating diseases, such as emphysema and bronchitis, cannot return to normal industry but can work part-time, often up to seven hours a day, in a sheltered workshop. The directors of the Altro Workshop, committed to a program of rehabilitation, believe they should limit the number of patients in need of permanent sheltered employment, to approximately 20 per cent of its present capacity.

The output of the workshop is sold on value, not sentiment, to hospitals, institutions, nurses, hotels, restaurants, and industrial concerns. During 1929, an average of 95 patients earned approximately \$87,000.00 in wages and received as a subsidy from charitable funds, \$26,000.00. The sales during the year were approximately \$270,000.00.

The demonstration of the Altro Workshop is significant, because the fundamentals of care can be applied in the care of those suffering from other

chronic diseases and can be provided by large industries. Not only can relapses be cut down to approximately one-third that found in the studies of what happens to sanatorium graduates, but these men and women can be made partially, or completely self-supporting.

A medical review committee was organized about four years ago. It is made up of a tuberculosis specialist, a consultant in general medicine, but particularly interested in tuberculosis, and our own tuberculosis examiner. All patients are examined by this special committee approximately once a year and before discharge. An evening is devoted to the examination of six patients with consultation in each case, following which the patient is invited in and the results discussed with him or her. When the patient has reached apparent cure and is ready to be graduated into normal industry, he is congratulated and given an opportunity to ask questions regarding his physical well-being. With our young women we invariably get the same question, "Will it be all right for me to get married and if I have a baby will it be well?"

A very large corporation with branches all over the United States has adopted a comprehensive plan of care for its tuberculous employees. The need for some plan was brought home by numerous requests for loans to start small businesses after sanatorium treatment and the many relapses that ensued. For many years this company had accepted its responsibility toward its employees by paying for sanatorium treatment and assisting the family during the cure period. In arguing for a scheme of graduated work in their own business organization, we urged that they could retain skilled workers, raise the morale of their employees, and secure for themselves a return on the investment in paying for sanatorium treatment and assisting the family.

In the invitation to the dedication of the new Altro Workshops, in December, 1924, we read, "The business of this unusual manufacturing enterprise is that of giving the convalescent tuberculous paid employment, and of allowing them to do only the amount of work per day for which they are fitted. A time-clock and a trained nurse see to that. The balance of their time they give to development of hope in their own hearts and health in their own bodies. This turns invalids into men and men can compete in the open market, just as the wearing apparel, made by them during their working hours, competes in the open market on a quality basis."

THE PLACE OF PASTEURIZATION IN A SCHEME OF MILK DISTRIBUTION*

BY A. S. M. MACGREGOR, M.D., D.P.H.,

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THE heating of ordinary milk during distribution is generally admitted to be an imperative necessity, and is in fact demanded by many city ordinances. In other quarters pasteurization is looked upon as a temporary measure, advisable under present conditions, which it will in time be possible to discard like other methods of preserving milk, and which will cease to be enjoyed in proportion as highly organized and efficient methods of production and distribution become general. Some nutritionists take a more positive view, and think that the sooner this time arrives the better it will be for the consumers, especially children. Some of the evidence on which an opinion may be based is clear enough; in other respects it is still in an experimental stage.

My experience leads me to adopt the view that milk supplied in bulk for consumption in large urban areas should be submitted to pasteurization by approved methods, the most powerful argument being that the menace of milk-borne infections is thereby largely eliminated and is restricted to such relatively infrequent incidents as may cause infection during or subsequent to pasteurization. Glasgow is no exception to the general experience that the increasing practice of this procedure has caused a corresponding decline in the capacity of milk to convey specific infection to the consumer. The pasteurizing of milk is now applied to between 80 and 90 per cent of the city's milk, while about 70 per cent of the supply is delivered in bottles. The history of milk outbreaks of disease where the source of infection was at the farm is entirely concerned with this diminishing portion of unpasteurized milk in the city's general supply.

As regards the history of pasteurization, this

process was first practised in Glasgow in the late nineties of the last century, when the "flash" system was introduced by the larger distributors, i.e., heating to about 160° F. followed by immediate cooling. Prior to this, the scalding or "scadding" of milk (to use a Scottishism) was resorted to by immersing cans of milk in open boilers at temperatures of 160° F. to 180° F., and thereafter cooling in running water. Subsequent to 1900, the rapid growth of the city demanded further supplies from greater distances, and pasteurization became more and more extensively employed to enhance the keeping qualities of the milk. The old flash system has been entirely superseded by modern methods, a change greatly assisted by the educative effect of the Special Designations Order of 1923, the transition to the positive holder type of pasteurizing machine as recommended becoming practically universal. There is a general reluctance to exceed a temperature of 145° F. and the United States' standard of 142° F. is sometimes adopted.

Pasteurization grew up and was widely adopted for commercial reasons, as it augmented the keeping quality of milk. It preceded, but did not, as was sometimes feared, prevent the undoubtedly great improvements which have taken place in recent years in the standards of production of raw milk, a large proportion (at least 70 per cent) of ordinary market milk being now comparable with that of Grade "A" quality. "Those who are producing and retailing graded milk have made it clear that, with proper control, it is possible to produce and sell unheated milk successfully, even in the poorer quarters of London." This remark occurs in Research Monograph No. 1 of the Ministry of Agriculture and Fisheries (1929), and might be applied to any city. It is quoted to show the trend of progress in the domain of milk production, and may be taken

* A paper, opening a discussion of the subject, read in the Section of Public Health, at the ninety-eighth annual meeting of the British Medical Association, August 28, 1930.

to mean that the argument of "commercial necessity" in support of pasteurization has lost much of its force, except in relation to the transport of milk over long distances.

There is no doubt that pasteurization of milk has added to the security of cities against the danger of milk-borne infections. This is a matter of great importance, and the following local illustrations may be quoted from experience in Glasgow. All the outbreaks of infectious disease whose source was traceable to farms were associated with supplies delivered direct and untreated from the farm to the consumer, or formed that part of the supply of a particular centre of distribution not subjected to pasteurization. The following incidents are taken from the records of recent years.

In 1912, a group of 19 cases of enteric fever on a milk supply delivered direct from farm to dairy was traced to a carrier at the farm. In 1927, an outbreak of 67 cases of paratyphoid B. infection broke out on a similar direct supply. Five of the dairy farm hands gave positive blood reactions, and two of them ultimately admitted having had mild and trivial recent illnesses. In 1913, 31 cases of scarlet fever occurred, due to a milker who had a mild sore throat and was not off work; she infected the dairy keeper with scarlet fever. In 1916, a group of 11 cases of scarlet fever originated from a girl of 12 years at the farm, preceded by two cases of "tonsillitis" without rash. In 1919, a series of 19 cases of scarlet fever occurred on the early morning direct supply from a farm, the probable source being a suspicious sore throat in a girl milker at the farm. In 1919, there occurred 32 cases of scarlet fever on a direct supply, the source of which was not definitely ascertained. In 1923, a series of 23 cases of scarlet fever on milk direct from a dairy farm was traced to a missed infection in a child of the dairyman who infected the milk during the convalescent desquamating stage of her illness. In 1925, a group of 6 cases of scarlet fever occurred on a farm supply where a young child was found with double otorrhœa following an apparently undetected attack of scarlet fever. In the same year, a series of 15 cases on a direct milk cart and dairy supply was connected with (a) scarlet fever in a farm labourer's child, and (b) otorrhœa following an unrecognized attack in one of the farmer's children. As regards

diphtheria, in 1913 a group of 13 cases originated from a child at a farm who had had no definite illness, but whose throat harboured the bacillus. In 1915, there occurred 115 mild cases in the neighbourhood of Glasgow, related to sores on the knuckles of three milkers and lesions on the udders and teats of eight of the cows. One of the milkers ultimately developed diphtheria, while "diphtheroid" bacilli were recovered from four of the cows and from the sores on the hands of the milkers. In 1922, a group of 10 cases on a direct supply was traced to a milker with enlarged tonsils harbouring the bacillus of diphtheria. Two considerable and severe outbreaks of septic sore throat have also occurred, due to undetected mastitis in dairy herds. In one of those, pasteurization of the supply pending full investigation cut short the outbreak.

In all these instances the milk was delivered in its natural state and was contaminated through the medium of an infected person on a farm supplying a local dairy in a suburban area. No similar incident has occurred on the main pasteurized supplies of the city. It has been pointed out that the purveying of milk is becoming concentrated in the hands of large distributors, supplies from numerous farms being mixed in wholesale fashion, so that the possibilities of spread from chance infections such as those instanced above would be greatly enhanced in the absence of an effective safeguard. Infections occur with sufficient frequency on the comparatively small proportion of raw milk to make one wonder what would happen if the protection of pasteurization were removed. When scarlet fever reached a high degree of prevalence three years ago, several cases were removed from dairy farms sending milk to the city from a neighbouring county.

As regards the possibility of eliminating these risks by more effective public health control, it must be confessed that this is a matter of considerable difficulty. The utmost precautions are defeated by such chance infections as those due to the very mildest cases of scarlet fever or diphtheria or paratyphoid fever, which are apt to be missed entirely. What is called "a chance risk of infection from some accidental carrier" is a real risk in populous areas. Many opportunities of infection occur among the personnel of farms in rural areas dotted with small townships and in proximity to a large city. Farms

are no longer isolated communities; transport makes it easy for farm servants and their families to mix with the general population, and when infectious disease is prevalent in the district the dairying community does not escape its share. It is, in fact, far from being immune. Epidemiological considerations do not suggest that the safeguard of pasteurization could be replaced by preventive control, however rigorously applied. In times of epidemic prevalence of infectious disease and in the present circumstances of milk distribution in large areas, the source of an outbreak might have to be sought for among numerous farms. The fact is that no one who is not in perfect health should milk cows or handle milk, so mild and elusive are the forms which infection may assume. It would be extremely difficult for this standard to be reached by the several hundred individual farms supplying a large city.

How much dependence can be placed on pasteurization in the prevention of tuberculosis and to what extent bovine tubercle bacilli may survive this process are difficult questions to which answers are being eagerly sought. Investigations into the thermal death point of tubercle bacilli in naturally infected milk by L. J. Meanwell are referred to in the review of this subject contained in the Research Monograph of the Ministry of Agriculture and Fisheries issued last year. In view of the importance of correlating the experimental results with the ordinary commercial practice of heating milk, the conclusions reached are worth quoting in full:

L. J. Meanwell carried out a long series of experiments in which he studied the thermal death point, at different temperatures, of *B. tuberculosis* in naturally infected milk, and has published his results. In addition he has made an epitome of his own work and that of other people from which the following conclusions are drawn:—

First, that Meanwell himself carried out 39 experiments, in which naturally infected and apparently normal tuberculous milk was heated to 145° F. for 30 minutes, and found living tubercle bacilli present on one occasion. In a second series of 19 experiments he heated naturally infected tuberculous milk which did not appear to be normal to the same temperature for the same time and again found living tubercle bacilli on one occasion. Secondly, that an epitome of recent work upon this subject demonstrated that of the four workers who employed naturally infected milk for their experiments, three found living tubercle bacilli after heating the milk to 145° F. for 30 minutes. Thirdly, that negative results were obtained by those workers who employed cultures of tubercle bacilli or pathological material which required chemical treatment before it could be inoculated. Fourthly, Meanwell's work demonstrated that tubercle bacilli in naturally infected milk

which had been heated to 140° F. for 20 minutes were usually destroyed, but that this combination of time and temperature left no margin of safety.

Meanwell finally concluded that commercial pasteurization of milk at 145° F. for 30 minutes, when efficiently carried out, is usually effective in destroying the tubercle bacillus, but that milk subjected to this process cannot always be guaranteed to be entirely free from this organism, especially when one takes into account the fluctuations in temperature, possible mechanical defects in the plant, and the natural desire to hold the milk at as low a temperature as possible in order to conserve the cream line. These factors are all liable to be present when working under ordinary conditions.

It therefore appears that, from an experimental point of view, pasteurization is effective in destroying tubercle bacilli in milk in proportion to the efficiency with which it is conducted. The question arises whether the positive holder method of heating milk, which, if carefully applied, fulfils the time temperature conditions laid down, and which is not universally employed, does in fact constitute a safeguard against infection. Definite positive evidence on this point would be difficult to obtain on the epidemiological side. There are certain suggestive features about the remarkable decline in the incidence of non-pulmonary tuberculosis which lend support to the view that pasteurization may have been a far from negligible factor.

During the last twenty years the death rate from non-pulmonary tuberculosis in Glasgow has fallen much more rapidly than has the corresponding rate for tuberculosis of the lung. Tracing the former rate since 1915, it is found that the decline in abdominal tuberculosis, *i.e.*, that form of the disease which is generally accepted as being caused by the bovine bacillus, has proceeded at an accelerated rate as compared with disease of other organs. Contrasting the five-yearly periods, 1915-19 and 1926-29, the total decline for all ages is from 59 to 30 per 100,000 of the population, or 49 per cent, while for the three constituent groups, tuberculous meningitis, abdominal tuberculosis, and other forms of tuberculosis combined, the fall is from 24 to 16, or 46 per cent, 17 to 7, or 59 per cent, and 19 to 10, or 47 per cent, respectively. Taking the age period under one year, the fall in abdominal disease is from 106 to 22, or 79 per cent; in tuberculous meningitis from 177 to 80, or 55 per cent; in other forms 41 to 21, or 49 per cent. For children between one and five years, the fall is respectively 65 per cent, 36 per cent, and 60 per cent. There has thus taken place a decided reduction in the incidence of fatal non-pul-

monary tuberculosis, a fact which is also associated with an increasing mildness in its various clinical manifestations. It will be observed that the decline in the abdominal form, especially at the younger ages, has been outstandingly rapid. These figures should, however, be accepted with some reserve, owing to the fact that in children, especially infants under one year, confusion may readily arise in death certification as between abdominal and meningeal tuberculosis, both of which may be manifestations of a generalized tuberculous infection. It is clear that some powerful protective influence has been at work, the nature of which can only be surmised. As regards abdominal tuberculosis, this affection has become more difficult to recognize and more amenable to treatment, while tuberculosis of the glands of the neck, also regarded as mostly a product of the bovine bacillus, has markedly declined in incidence and severity. This reduction in bovine infections cannot be definitely ascribed to any particular underlying cause, but, in the absence of a satisfactory alternative explanation, it appears to me that pasteurization should be included among the likely factors, and that public health administration should, for this reason, support the efficient pasteurization of ordinary market milk, excluding, of course, the designated milks from duly attested and inspected herds.

There is, however, another and highly important aspect of the matter, the relative value of raw and heated milk as an article of food especially for children. Little is known about the chemical changes which take place in milk heated to comparatively low temperatures, although certain suggestive observations have been made indicating that pasteurization may assail the delicate nutritive qualities of raw milk to a material degree, and that fresh milk of high quality from accredited herds is best for young children. Such evidence as exists is conflicting, but should it be clearly demonstrated that pasteurization deprives milk of an essential constituent, there will arise the question of a radical change of policy in milk distribution in the interests of the young.

In conclusion, the systematic pasteurization of ordinary market milk intended for consumption in large urban areas is, in my opinion unavoidable under present conditions where milk

is collected and mixed from widely scattered and varied sources, not under such scrupulous control as to eliminate the risk of chance infections, a danger which experience shows to be very real. It is difficult to resist the view, which is supported by experimental evidence, that efficient pasteurization is of real protective value against bovine tuberculosis and that this practice could not be dispensed with until tuberculosis in dairy herds has been reduced to a minimum.

DISCUSSION

DR. M. R. BOW (Alberta) followed. It was the duty of the health department to insure a safe milk supply. Whilst theoretically pasteurization was undesirable, in practice it should be given a definite place in any scheme of milk distribution. Clean milk is not necessarily safe milk, although all measures to improve the cleanliness of the milk should be encouraged, and the dairying trade and the public taught that the need for continuous careful supervision of pasteurizing plants by health authorities is shown by the recent disastrous typhoid epidemic occurring in Montreal. Without this there is a most dangerous sense of false security. Apart from its effect on vitamin "C", it appears that the process of pasteurization does not impair the nutritive value of milk; fruit and vegetable juice can be given to the child to make good this deficiency. For efficient pasteurization the milk must be held at the required temperature for a sufficient length of time and then rapidly cooled. The experience in Canada has been wherever scientific pasteurization has been employed, milk-borne infections have been reduced to a remarkable degree. The degree to which the process is used differs widely in different parts of the country.

PROF. J. G. FITZGERALD (Toronto) referred to the work of Dr. Ray Price in Toronto, dealing with strains of *B. tuberculosis* isolated from children suffering from non-pulmonary forms of tuberculosis admitted to the Hospital for Sick Children from communities where pasteurization by-laws were and were not in force.

DR. GRANT FLEMING (Montreal) welcomed Dr. Macgregor as a supporter of pasteurization. He did not believe in milk grading, but urged that all milk should be pasteurized certified milk. Milk is either pasteurized or it is not. Certified milk is not safe, because of the human element. Pasteurization not only destroys the tubercle bacillus, but, what is of more importance, the pathogenic organisms responsible for other communicable diseases. The epidemic in Montreal was not due to lack of ability of the Health Officer and his staff. Its continuance depended on political interference.

DR. MACGREGOR, in reply, expressed his appreciation of Dr. Bow's contribution as a clear and inspiring exposition of the subject. He re-emphasized the fact that clean milk is not necessarily safe milk. In Great Britain the big milk distributors had saved the situation by adopting pasteurization for commercial reasons. The impulse to this however had diminished with the production of cleaner milk. The public is confused by official "grading". The higher grades are unpasteurized and their increased production will diminish *pari passu* the amount of pasteurized milk consumed. This is undesirable and the place of pasteurization as a necessary element in scientific milk control must be consistently asserted.

THE LABORATORY IN A SCHEME OF PREVENTIVE MEDICINE*

BY W. G. WILLOUGHBY, M.D., D.P.H.,

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THE use of the laboratory in the diagnosis, prognosis, and treatment of disease, and in investigations upon such matters as food and water supplies involving the health and comfort of the individual and of the public, has steadily increased in recent years. Chemical and bacteriological work in connection with examinations of milk and other foods, water, rivers, sewage effluents, etc., has become a regular part of the scheme of preventive medicine, and public analysts are among the regular officials of a public health authority. The position with regard to human pathology is not so defined, and varies very much in different localities.

From its earliest days, and even in its then limited range, the public health service has been particularly concerned in the prevention of infectious disease. It was natural, therefore, that, with successive discoveries in the bacteriology and pathology of the infectious diseases, increasing need for laboratory work in connection with the public health department should have been felt. The public health service has developed from being concerned mainly with the environment of the public into a more personal contact with the individual in regard to all forms of ill health, and not merely a limited number of infectious illnesses. The need for the frequent and systematic aid of the laboratory has correspondingly developed, and there are no public health departments in this country without some arrangements more or less complete, for this important aid to the work.

It is in the interest of public and personal health that laboratory assistance should be systematized and made available for all persons for whom it may be required, and not merely for those coming directly within the province of

the public health department in other ways. It is difficult to see how this could be managed without the aid of the public health department. This is shown by the frequent applications of medical practitioners to the department for laboratory assistance, especially in the case of those patients unable to pay fees for the work done. While necessary in these cases, it is also found convenient by practitioners that in other cases also the arrangements should be made by a central authority. This should not interfere with, but rather assist, the practice of specialists in pathology. The public health authorities can avail themselves of the services of practising pathologists, and in the majority of cases this would be the best and most convenient system, the function of the public health authority being on the whole limited to seeing that such a service is available for every one and that payment is made according to means.

It may be necessary occasionally that the public health authority should itself supply pathological aid as well as provide that such systematic assistance is available. Examinations for diphtheria and tubercle bacilli are often with advantage carried out directly by the officers of local authorities. The practitioners of a district find it convenient to have these examinations made locally, and arrangements made for receiving specimens at any time of the day or night.

In large cities the problem of systematizing laboratory aid is an easy one. Either a university, medical school, or a laboratory attached to a large hospital may be the centre at which the work is carried out, not merely for the city itself but for a large area in its neighbourhood. If there are specialists in the subject practising in the district, their services can be used. There are also excellent pathological institutes for carrying out the work. A systematic scale of fees can be arranged, outfits for taking the vari-

* A paper opening the discussion of the subject in the Section of Public Health, ninety-eighth annual meeting of the British Medical Association, Winnipeg, August 28, 1930.

ous specimens can be sent out, and the full time of the pathologist and his assistants occupied. Expert pathologists are always to be found in large centres of population.

In rural districts the problem is more difficult, though in countries so thickly populated, and with such convenient means of transport as in England, there is little extra practical difficulty in using the large centres for most of the work, and this plan usually obtains. There are comparatively few instances where laboratory aid for diagnosis, prognosis, or treatment is so urgent that this convenient and economical method of using large centres would lead to serious difficulty. Unless time is a very pressing essential there are distinct advantages in using a large laboratory where not only the experience of experts can be drawn upon but also where students can profit by laboratory work on problems which will later on fall to them in private practice.

When the public service and public funds of a local authority are involved, it is, I consider, advisable to limit the pathological and bacteriological aid to the work essential for public and personal health. Experimental research comes under a different category, and, though to be encouraged, cannot as a rule be considered to be within the scope of the ordinary duties of local authorities.

Specimens sent for examination through a local authority should as a rule be for a definite object and not merely in a vague hope that the laboratory can take the place of a careful examination of the patient and in this way supply a clue.

Without under-rating the value of laboratory aids in diagnosis, prognosis, and treatment, I deprecate the tendency to rely so much on this to the exclusion of thorough personal examination and clinical methods. Too much dependence on laboratory aid leads to lack of care in other methods concerned with the personality of the patient, and destroys that careful investigation which should be so useful in every form of illness. The laboratory should be relied on to assist or confirm diagnosis rather than to make it. In diphtheria for instance, where immediate specific treatment by antitoxin is so valuable, I have met cases where the delay required for a laboratory result of a throat swabbing has seriously prejudiced the chance of recovery. In

most cases diphtheria can be diagnosed without laboratory aid, and early treatment is so important that in probable cases the antitoxin treatment should not be delayed for a bacteriological report.

Another important point is that a negative pathological finding may lead to omission of specific treatment which would be against the public and personal interest. This is occasionally the case in diphtheria where for various reasons, such as the previous use of antiseptics, or omission to take rubbings of both nose and throat, a negative result may be obtained in a definite case of this infection.

During the European War, I had an interesting example of how bacteriological investigation may cause considerable unnecessary inconvenience. On one of the fronts, most of an unit was held up for what was described as an outbreak of diphtheria, there being many positive cases reported from the pathological laboratory. On examining the men concerned, I had a strong doubt as to the diagnosis, and visited the laboratory, where I found that none of the cases really showed true diphtheria bacilli, but only diphtheroids. In other diseases besides diphtheria I have known incorrect laboratory reports to give considerable inconvenience.

In spite of these drawbacks however, the enormous value of pathological investigations makes its systematization essential, and, as the public health departments are bound to be the starting points of this work for the poorer section of the community, the work must apparently, if it is to be systematized, be under the department of the public health service.

Quite as important as the pathological investigation itself is the ability of clinicians to interpret pathological findings. One of the important reasons for the employment of the best pathologists is that they can frequently assist the clinician in the interpretation of results.

Though as a rule, from the public health point of view, diagnosis with a view to proper treatment will be the most common use of the pathological laboratory, a branch of the work is the preparation of autogenous vaccines. As far as my experience goes, there has recently been a decrease rather than an increase in the request for autogenous vaccines by medical practitioners for their patients.

The provision of laboratory assistance by

public health authorities, beyond chemical and bacteriological work by the public analyst, has so far been more or less limited to the case of infectious illnesses, including venereal diseases and tuberculosis, and to a slowly increasing use in other departments such as maternity and child welfare. The rapid advance in pathological science in so many conditions not in past time recognized as coming within the direct purview of public health authorities has clearly demonstrated that systematic centralized pathological aid should be within the reach of everyone, and is essential to any complete scheme of preventive medicine.

DISCUSSION

DR. M. R. BOW (Alberta) said that in providing efficient laboratory service for small urban and rural districts he had found that the plan of employing the municipal hospital laboratory for public health purposes had worked most satisfactorily, on a sliding scale of charges. This arrangement gave the hospital laboratory workers the preventive viewpoint. He discouraged the use of inadequate doses of diphtheria antitoxin; no packages containing less than 20,000 units were distributed. In remote districts diphtheria patients were released after three weeks quarantine without swabs; in districts accessible to a laboratory two negative cultures are required.

DR. A. S. M. MACGREGOR (Glasgow) referred to the function of the laboratory in a scheme of research in dealing with the problems of bacteriology and immunology. He discussed the situation that had arisen under the Local Government Act which enlarged the scope of the medical work of local authorities in Great Britain. One of the problems of the future would be how to take full advantage of the facilities for research which these new responsibilities would provide. This branch of preventive medicine should develop in coöperation with all the other laboratory facilities in the area.

DR. J. T. PHAIR (Toronto) stated that the provincial department maintained a central laboratory at Toronto with some seven branches placed at the strategic points in the province. The service is gratuitous and largely used. During the last two months a full time pathologist had been added to the central office staff, and the department is now prepared to offer further assistance to the general practitioner, by the examination of pathological tissue of any type. For this service a fee of \$1.00 per specimen is charged.

PROF. J. G. FITZGERALD (Toronto) congratulated Dr. Willoughby on his statement in precisely defining the functions of a public health laboratory in assisting general practitioners to determine the diagnosis in cases of communicable disease. He believed that the legend "Diagnoses are not made here" should be placed over the door of every laboratory. He emphasized the value of the early administration of a large dose of antitoxin in every instance in which the practitioner has reason to suspect that the patient is suffering from diphtheria regardless of the result of the examination of the material submitted to the laboratory for examination.

DR. JAMES ROBERTS (Hamilton, Ont.) stressed the importance of the personality of the director of hospital laboratories doing public health bacteriology. The laboratory should be situated within easy access of the building, where the work of the administrative health officer is carried on. In Hamilton the public health laboratory is combined with the hospital laboratory, and this arrangement is working satisfactorily. Schick and Dick tests to determine susceptibility of contacts are preferably done by a laboratory expert, and the number of such examinations, with others such as those for ringworm in school children, are found to be materially increased if the laboratory service is readily available to the executive officer. The general public are entitled to the financial saving which follows the shortened detention of suspects and contacts when frequent use of the laboratory is made, and this should be pressed for by the chief of the department who will extend this diagnostic service whenever it can be done to the advantage of the individual citizen.

DR. A. GRANT FLEMING (Montreal) gave as his experience that practitioners do not often expect the laboratory to make a diagnosis, and that in this matter the form of the report was of some importance. He asked whether in England the release swabs after diphtheria attacks were taken by the private physician or the public health officer.

DR. ALFRED GREENWOOD (M.O.H. Kent) expressed appreciation of Dr. Willoughby's paper. The bacteriological laboratory in the county of Kent examined 25,000 specimens annually for 1,100 general medical practitioners in the county free of charge. The laboratory should be considered primarily as an aid to diagnosis, and his belief was that the laboratory was an important factor in binding medical men together. He emphasized the desirability of injecting large doses of antitoxin in diphtheria at the earliest possible moment without waiting for a report from the laboratory, and even after negative reports where the clinical signs suggested a diphtherial infection.

DR. WILLOUGHBY, in closing, said that diphtheria antitoxin could be obtained in his jurisdiction at any hour of the day or night. He thought that research work should be done outside of state laboratories.

THE SHOVEL-TOOTHED MASTODON.—The discovery of remarkable fossil deposit on the shores of an enormous lake, now dried up, near the borders of Outer Mongolia, is reported by Mr. Roy Chapman Andrews, who has returned to Peking.

Buried in a mass of soft mud, in which the beasts were evidently entrapped while searching for food, the Expedition found the remains of some 25 or 30 shovel-

toothed mastodons (*platybelodon*), with huge projecting jaws averaging about 5½ ft. long. Another bog-hole contained skeletons of from 10 to 15 baby mastodons, presumably deserted by their parents when unable to extricate themselves from the quicksands.

The chief scientific importance of the discovery lies in the fact that it is now possible to make a perfect reconstruction of a creature of which previously only a single jaw had been found.

ON THE ADMINISTRATION OF IRON

BY V. E. HENDERSON AND T. A. SWEET,

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LADIES have discarded the corset; concurrently chlorosis seems to have vanished. With these events, physicians have lost one of the most specific indications for the exhibition of iron. Nevertheless, the physician still finds many occasions when he considers it necessary to prescribe this drug, especially to children. Many of the mixtures containing iron prescribed by physicians are extremely unpleasant. Proprietary preparations are often more palatable and are consequently preferred by patients, yet a doctor recommending these proprietaries has no assurance that they contain adequate amounts of iron, or even the amounts that they are supposed to contain. Consequently, a study of combinations of the pharmacopœial preparations of iron and of flavours has been undertaken with the object of presenting certain simple and palatable recipes.

In the Pharmacopœia there are available for administration in mixtures the following iron salts:— the Perchloride in the form of the Solution and the Tincture, the Sulphate, the Iron and Quinine Citrate, the Iron and Potassium Tartrate and the Iron and Ammonium Citrate.

Both the sulphate and the preparations of the perchloride are intensely astringent and metallic in taste and are consequently difficult to cover adequately. There is no evidence that they are more effective than the other preparations, consequently they will not be further considered.

The iron and quinine citrate possesses little or no astringency, but has, owing to the quinine content, a very persistent and disagreeably bitter taste, which is extremely difficult to disguise. Further, the authors believe that there is no reason for the employment of quinine in the vast majority of cases in which iron is indicated. In ten grains of this scale salt there is only about one and a half grains of quinine. This quantity

is too small to have any antipyretic effect. Further, Hardiker's exhaustive study of the action of quinine on metabolism, carried out under Cushny's supervision, has shown that it does not decrease tissue metabolism and heat production in pharmacopœial doses. Its central antipyretic action is weak in therapeutic doses, and in any other fever than malaria, not evident. The effect on temperature, even in huge doses, is very slight. This is not true, of course, of cases of frank malaria where it has an antiseptic effect. There is no good evidence that it has any corresponding antiseptic effect on the ordinary pathogenic organisms. If a pure bitter is indicated, quinine is the most disagreeable one that the pharmacopœia contains, and is only equalled by those which also contain tannins, such as gentian.

Both iron and potassium tartrate and the iron and ammonium citrate, when well prepared, have little astringent taste, but a well marked metallic one. The astringent taste becomes more marked the longer they are held in the mouth. None of the flavouring syrups alone cover this metallic taste adequately. The two best are genuine *British Pharmacopœia* syrup of lemon and syrup of ginger.

The best covers are simple syrup, with compound tincture of lavender, or liquid extract of liquorice, or compound tincture of cardamoms. Consequently, we would recommend the following simple iron mixture:—

R	Ferri et Ammonii Citratis	gr. v
	Tincture Lavandulæ Compositæ	m. v
	Syrupi	m. xv
	Aquæ ad	3 i

For the tincture of lavender an equal quantity of liquid extract of liquorice may be substituted if the patient likes liquorice, or some 15 minims of compound tincture of cardamoms.

If the physician has a diabetic or a child to whom he does not wish to give sugar, the prescription may be written thus:—

R	Ferri et Ammonii Citratis	gr. v
	Tincture Lavandulæ Co.	m. v
	Glusidi (saccharin)	gr. 1/10
	Aquæ ad	℥ i

Either liquorice or cardamoms may be substituted for the lavender, or 15 minims of glycerine may replace the saccharin, though the mixture is then not quite so palatable.

To either of the above prescriptions arsenic, in the form of liquor arsenicalis, may be added:

R	Ferri et Ammonii Citratis	gr. v
	Liq. Arsenicalis	m. ii
	Tr. Cardomomi Compositæ	m. v
	Syrupi	m. xv
	Aquæ ad	℥ i

If the physician desires to use a laxative with the iron the most agreeable form in which it may be added is as sodium sulphate, which has not the unpleasant bitterness of magnesium sulphate. In this case, liquorice with syrup is much the best flavour to use.

R	Ferri et Ammonii Citratis	gr. v
	Sodii Sulphatis	gr. xx
	Extr. Glycyrrhizæ Liq.	m. v
	Syrupi	m. xv
	Aquæ ad	℥ i

If the dose of sodium sulphate must be increased to 30 gr., the total quantity must be increased to 2 drachms and then the liquorice may be increased to 10 minims.

Bitters are often given with iron. Only three bitters need to be considered, quassia, calumba, and strychnine or nux vomica. Of these strychnine or the tincture of nux vomica is the most pleasant, and calumba the least agreeable. Five minims of the tincture of any of these bitters may be added to the above prescription. With nux vomica the mixture will not be at all disagreeable to most persons.

Strychnine has the further advantage that it tends to increase the reflex excitability and muscle tonus which are often recognized by patients as a sense of fitness. In the following prescription, its bitterness is almost completely disguised.

R	Ferri et Ammonii Citratis	gr. v
	Liq. Strychninæ Hydrochloridi	
	Extracti Glycyrrhizæ Liquidi ana	m. v
	Syrupi	m. xv
	Aquæ ad	℥ i

Again bromides in 5 or 10 gr. doses may be added to the above preparations without changing the flavour, if the sodium bromide be used. We have chosen to use the iron and quinine citrate for these mixtures because it may be used in all cases, while the iron and potassium tartrate may produce cloudiness or precipitation with bromides and liquorice.

The most palatable iron preparation we know is based on an old fashioned prescription containing the solution of the perchloride, aromatic spirits of ammonia and syrup, but this is greatly improved if written thus:—

R	Liquoris Ferris Perchloridi	m. xlv
	Liq. Potassæ	℥ iii
	Ammonii Carbonatis	gr. iiss
	Tincture Limonis	
	Spiritus Myristicæ ana	m. vii
	Syrupi	℥ iii
	Aquæ ad	℥ i

A dose of 1 dr. contains approximately 5½ min. of the solution of iron perchloride. To this preparation liquor arsenicalis or bromides, or sodium sulphate, may be added, but not *strychnine in any form*. The order in which the ingredients are mixed is very important. The iron chloride and syrup should be mixed together, and then to this is added with stirring the caustic potash, dissolved in about half an ounce of water. The mixture is well stirred and the ammonium carbonate added with stirring. The mixture gradually darkens and any precipitate disappears. The other ingredients are then added.

The dosage of iron in these prescriptions has been so chosen that the physician can readily double the amount by doubling the dose. In many cases, a change in relative amount of the flavouring ingredients will make an appreciable change in the flavour of the mixture.

M. Kitchevatz reports the case of a young medical student who pricked his finger while making a post-mortem examination of a child who had died from congenital syphilis. He painted the wound with iodine and washed it well in soap and water, but about a fortnight later he noticed a small red nodule; this was opened and sero-sanguinolent fluid was evacuated. The

lesion was treated as a whitlow, and no suspicion of syphilis was entertained. The swelling was painless, but later on the glands at the elbow and axilla enlarged, and the hand became swollen; it was then thought to be tuberculous. A dermatologist subsequently diagnosed a chancre, and further examination provided ample evidence of syphilis.—*Bull. de Derm. et Syph.*, p. 484, April, 1930.

Case Reports

A GIANT URETERAL CALCULUS*

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Several instances of the formation of unusually large calculi in the ureter have been reported. The largest, according to records obtainable by us, was removed by Porter, and weighed approximately 92 grams. It was one of a collection, which weighed in all 114.4 gm. Boveé removed one weighing 84.9 gm. Tenant's specimen was 66 gm. Other large calculi are reported by Israel, 54.4 gm., Fedoroff, 52 gm., Specklin, 51 gm., Jacobs, 44 gm., the Mayo clinic, 40 gm., Pozzi, 34.5 gm., Jeanbrau, 34 gm., Parker, 33.3 gm. Some of the larger calculi filled a considerable length of the ureter. One reported by Rovsing was 18 cm. in its longest axis.

A calculus in the ureter of a patient recently coming under observation in the urological service of the Montreal General Hospital was of such unusual size and had led to such symptoms, that we feel it is worthy of being put on record.

CASE REPORT

A male, aged 35 years, was referred by Dr. Gordon M. Hume, Sherbrooke, Que., December 20, 1926, complaining of passing thick urine, and of occasional pains in the left groin. In August of the same year, while playing football, he received a severe blow in the "pit" of the stomach. He was confined to bed for three weeks, during which time there was a steady pain in the left upper quadrant. When admitted to the Sherbrooke Hospital he had a temperature of 104°, and complained of slight burning on urination and a slightly increased frequency by day. The urine contained pus. The temperature gradually subsided, but occasional pains persisted in the left upper quadrant, running down to the suprapubic region. He remained

in hospital for three weeks, during which period he lost 22 lbs. During the interval, up to his present admission, he has been working, and has regained the lost weight, but has continued to have occasional pains in the left loin, and his urine has remained purulent.

Condition on admission.—A well built man in a state of good nutrition, slightly under his normal weight. Temperature and pulse normal. A mass was felt in the left abdomen, at the left border of the rectus and mainly below the level of the umbilicus. This mass was tender on palpation and there was also tenderness in the left costo-lumbar angle. No ballottement.

Urinalysis.—Specific gravity 1018; alkaline, albumin +, sugar 0, red blood cells, 8 per high power field, polymorphonuclear leucocytes, 200 per high power field.

Blood Count.—Red blood cells 3,770,000; white blood cells 10,600; hemoglobin 73 per cent.

Wassermann.—Negative.

Blood Chemistry.—Urea nitrogen 14 mgm. per 100 c.c. Urea concentration factor = 42.

X-ray examination showed a large oval shadow in the left pelvis, in the anatomical situation of the ureter.

Cystoscopic examination was performed on December 21, 1926. The bladder was of normal capacity. There was a regular rounded bulging on the left side. The right ureter was catheterized easily and a pyelogram made. The urine from this ureter showed an occasional pus cell. The pyelogram showed moderate dilatation of the pelvis of the right kidney. The ureteral catheter entered the left ureter for 2 cm. where it was obstructed. The ureterogram of this side showed the fluid leaving the catheter and a thin film spreading around the lower half of the shadow. No urine was obtained from this ureter. The diagnosis was, left ureteral calculus, left pyoureter and pyonephrosis.

Operation on December 29, 1926. Left ureterolithotomy. The left ureter was exposed, extraperitoneally. It was very greatly dilated. Its walls were thickened and there was a kink in it just above the brim of the pelvis. A large stone was felt low down in the ureter, difficult of access. An incision was however made in the ureter just above the upper end of the calculus. This liberated a copious, thin, pale, purulent urine. It was difficult to remove the stone, so firmly was it impacted in the ureter and in attempting to grasp it with forceps, its friable and gritty top was broken away in small pieces. Only after several attempts was a good grasp obtained and the stone could be removed. On its inferior surface were two facets, corresponding to two small stones which were removed. The passage of a probe into the bladder was prevented, apparently by stricture. The upper ureter was drained, a one-half inch rubber tube being passed beyond the kink or valve-like obstruction above noted. The wound was closed, and cigarette drainage used.

There was very little drainage through the tube, only 100 c.c. of pale, purulent urine being obtained in twelve hours. No indigo-carmin injected intravenously appeared in five hours' observation. Cystoscopy was again performed on January 11th, when the catheter was again found to be obstructed at 3.5 cms. from the bladder. A pyelogram secured by injection through the drainage tube showed a greatly distended ureter and kidney pelvis.

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On January 17th left nephrectomy and ureterotomy were performed. The kidney, a flaccid, flabby sac densely adherent to its surrounding fatty capsule was removed with as much ureter as possible. After closure of this incision, the previous incision was reopened, and the proximal portion of the ureter grasped with forceps, pulled down and removed down to the bladder. The lower wound required a secondary suture on February

8th. Convalescence was otherwise uneventful. The patient was discharged on February 19th, well. The urine was pus free.

The pathological report by Dr. L. J. Rhea, (M.G.H.S-27-59) was as follows: "The gross specimen is a kidney and ureter. The ureter is thickened and widely dilated. The kidney pelvis is dilated. Both show evidence of inflammation. There is marked atrophy of the kidney substance and many dense fibrous adhesions are adherent to the kidney surface."

"Diagnosis: Dilatation of the ureter and kidney pelvis. Acute and chronic inflammation. No evidence of tumour or tuberculosis."



FIG. 1.—Large shadow in the left pelvis.

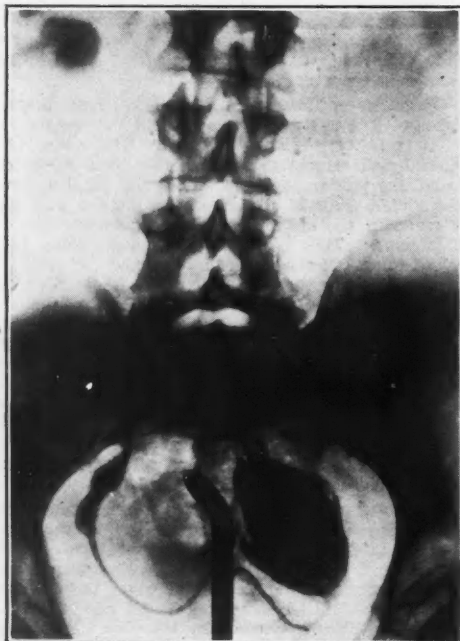


FIG. 2.—Attempted ureterogram, left side.



FIG. 3.—Uretero-pyelogram, injection being made through the drainage tube in the ureter.



FIG. 4.—The calculus removed at operation.

"The specimen consists of a large roughly oval shaped quite firm, but rather light calculus and several irregularly shaped fragments which were detached from it during its removal from the ureter. The external surfaces of the large mass and the fragments as well are dark brown. The two extremities of the large calculus are very irregular. All the specimens are put aside in order that they may dry, when further examination will be made and a reconstruction carried out."

Unfortunately the calculus was not weighed at the time of removal. Six months later, when some loss had occurred by drying and crumbling, the weight was 31.1 grams. Its exact measurements could only be estimated, owing to the breaking of its upper pole into fragments in the process of removal. By comparison of the measurements of the x-ray shadow and the known dimensions of the stone, its measurements were estimated as 4.1 x 6.3 cms. At its greatest circumference it measured 11 x 15.3 cms. A thin, dark brown shell was easily removed from the large specimen, leaving a white surface from which a powdery material was easily obtained on scraping. When the large stone was sawn through its centre, the following was seen: "The cut surface which is for the most part white, though there are here and there small areas of a pale brownish tint, shows concentrically arranged bands of calculous material of varying width. A few open spaces are seen. There is no definite central core."

Chemical examination of the calculus by Dr. I. M. Rabinowitch showed it to be composed of calcium-magnesium phosphate, contaminated with fibrin.

The sequence of events in the case may only be surmised. Whether the stricture of the ureter was congenital or acquired and occurred first and the calculus formed afterwards, or a renal calculus descended, became impacted, with acquired stricture formation, it is difficult to determine. At any rate ureteral and pelvic distension resulted from the lower ureteral obstruction, with superadded acute infection and pyonephrosis, induced by the traumatism, from which time dated his first symptoms of gross infection.

The absence of any kidney function, and an almost totally destroyed kidney, necessitated nephrectomy. The removal of the distended and infected ureter above the stricture was equally indicated in view of the danger of its continuance as a "pus pocket".

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DIPHTHERIA OF THE CONJUNCTIVA*

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One of the most violent, but fortunately one of the rarest, of conjunctival infections, is that caused by the Klebs-Loeffler bacillus. We have seen two such cases, with positive cultures, both in infants. Textbooks describe two forms of diphtheritic conjunctivitis. The superficial, or croupous, is characterized by the presence of a greyish white membrane which adheres closely to the conjunctiva. Beneath it the conjunctiva is found greatly swollen and reddened, with areas of bleeding. The course of the disease lasts about two weeks, when the membrane will have disappeared without leaving any permanent changes in the conjunctiva. The second is called the "deep" form and runs a much more serious course. On everting the lids, one finds, besides the marked swelling and redness of the conjunctiva, spots, in which the conjunctiva is somewhat depressed, smooth and of a greyish yellow colour, often with a few dirty red speckled markings—ecchymoses (Fuchs.)

After a short incubation period the deep form goes through the stages of infiltration, blennorrhoea, cicatrization, and is in all respects much more severe than the croupous. Fuchs attributes the first exact description of conjunctival diph-

* Read at the meeting of the American Ophthalmological Society, Hot Springs, June 2, 1930.

theria to von Graefe, who saw many cases in Berlin. He distinguishes two groups of the deep variety, diphtheria *en plaques*,—constituted by the lighter cases, where the diphtheria spots are found under the form of large or small islands. These occur especially on the conjunctiva of the lids and between them lie areas of tissues in varying stages of disease. In the more severe cases the diphtherial foci rapidly coalesce so that the entire conjunctiva becomes rigid and bloodless.

C.B., a baby girl of 8 months, was admitted to the Alexandra Contagious Diseases Hospital, on the evening of January 8th, 1930, having been fretful and miserable for some ten to twelve days. Examination showed a fine fading rash on the face, trunk and extremities. She was apparently convalescing from measles. The most noticeable clinical feature about her was the condition of her eyes. The lids were swollen, hard, and almost completely closed. There was a profuse purulent discharge and on the palpable conjunctiva of the four lids was a well marked greyish white membrane, adherent to the conjunctiva, which when removed caused slight bleeding. The temperature was 102°; pulse, 162; respirations, 38. There were no other signs of diphtheria about the child, but it was believed that the condition of her eyes was due to diphtheria, so a culture was taken, and she was given twenty thousand units of anti-diphtheria serum intraperitoneally. The next day the culture

was found positive to the Klebs-Loeffler bacillus, On January 11th, three days after her admission, there seemed very little change in the appearance of the membrane of the conjunctiva, and there was still profuse discharge from the eyes. One per cent silver nitrate was now added to the treatments which had consisted of boric acid irrigations, and simple ointment to the edges of the lids.

Two days later considerable improvement was noted, the temperature was normal, and the conjunctival discharge much less. The left eye was now kept open at odd intervals, but on the right side a small catarrhal ulcer appeared at the temporal side of the cornea. Five days later, the improvement was very noticeable, the discharge was much less, and the membrane had practically disappeared. At this time, and four days later, cultures were negative to Klebs-Loeffler bacillus. The small ulcer healed, leaving only a tiny scar, and the patient was discharged well on February 4th.

Membranous conjunctivitis may be caused by bacteria other than the Klebs-Loeffler bacillus. That due to the streptococcus is a severe form, seen particularly in children the subjects of one of the exanthemata. A similar clinical appearance occurs in certain gonorrheal and thrush cases, while milder forms are found in pneumococcus, meningococcus and Koch-Weeks infections.

PSITTACOSIS.—The picture presented by the case of psittacosis reported by T. M. Rivers, Bernard Benjamin and G. P. Berry, New York, was typical. The onset of the illness and the general appearance of the patient reminded one of a mild attack of yellow fever in which jaundice and bleeding are absent. (Some have likened it to typhoid.) Nevertheless, the important observation on physical examination is a consolidation of the lungs. The chief symptoms were severe and persistent headache, backache, and abdominal discomfort caused by distention. The tongue was covered by a peculiar heavy white coat that endured for more than two weeks. From the chart it is obvious that there was a disproportion between the pulse and the temperature. The most striking feature of the disease was the fact

that, in spite of the marked involvement of the left lung, no symptoms referable to the chest occurred. There was no increase in rate of respiration, no pain on breathing, very little cough, and no expectoration except on two occasions. The results of their work in connection with the case reported at this time serve to emphasize the fact that the etiologic agent of psittacosis is neither Nocard's bacillus nor any other ordinary bacterium. Moreover, it appears that the white mouse may serve as a suitable animal for diagnostic purposes. Thus, in many instances, a laboratory diagnosis that ordinarily would be unfeasible will become possible. Finally, it has been shown that the virus of psittacosis is in the sputum of individuals with involvement of the lungs, and this fact should be borne in mind by those who care for these patients.—*J. Am. M. Ass.*, Aug. 23, 1930.

Clinical and Laboratory Notes

THE USE OF SISTOMENSIN

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For many years the periodically appearing yellow gland of the ovary, the corpus luteum, has been associated with the menstrual habit. Within recent years we have learned that ovulation and menstruation bear a definite relationship to each other, especially in man, and that the corpus luteum forms from the granulosa cells left in the Graafian follicle after rupture and expulsion of the ovum.

Hitchmann and Adler,¹ in 1908, showed that in the human being ovulation and menstruation did not occur simultaneously, and also proved that the implantation occurs in the late pre-menstrual phase. It has also been shown that ovulation occurs about twelve to fifteen days after the last regular menstruation.

Recent experiments have proved that two distinct biological assays may be obtained from the human ovary, a watery extract which is procured before the ovum leaves the follicle, and an oil assay which may be extracted from the ovary after the expulsion of the ovum. As regards the experimental evidence for such an assay, the Allen-Doisy test for the relationship of the corpus luteum to the oestrus cycle has been wholly accepted for a number of years, but this test is a qualitative one and the more recent Nissl test, or cervix ganglia nerve changes, is possibly a more specific one. In 1864 Frankenhauser described a nerve supply of the uterus and located a sympathetic nerve plexus lateral to and on each side of the cervix uteri in the transverse parametrium. At puberty, certain hypertrophic changes occur in these two large ganglia and regression changes likewise occur at the menopause independent of other sympathetic nerve ganglia. If we remove the uterus by a sub-total hysterectomy and leave the ovaries the patient may, for a year or so, have no untoward symptoms, but later organized exudate and granulation tissue cause atrophy changes in the cervical ganglia and ovarian deficiency is then evident. Experiments conducted by Kennedy^{2 & 3} show that regenerative changes occur in these ganglia after castration on the administration of sistomensin. This appears to be logical.

I first had an opportunity to observe the biological behaviour of "sistomensin" in the European clinics. Upon my return I started to use it systematically* in all cases of inflammatory metrorrhagia, along with diathermy and local treatment. After treating about fifty such cases I could promise the patient, provided my diagnosis was correct, an arrest of the bleeding in forty-eight hours. I have treated 100 such cases with success. I could also assure success in late post-partum bleeding. Tumours, cancers, incomplete abortions, etc., are not affected. As regards dysmenorrhoea and sterility I have had no specific results. Climacteric neurosis improves greatly on the injection of sistomensin.

The explanation of the biological behaviour is expressed by regenerative changes in the mucosa of the uterus and also by checking immature development in the corpus luteum. Sistomensin will also supply the corpus luteum hormone when it is decreased in the menopause.

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* The sistomensin used was kindly supplied by the Ciba Company, Montreal.

THE TAKATA-ARA TEST FOR CEREBRO-SPINAL FLUID

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This method of investigation of the cerebro-spinal fluid was introduced in 1925 by two Japanese workers, Takata and Ara.¹ Since then it has been intensively investigated and utilized in European hospitals, particularly in Germany and Austria. On this continent, however, it has so far obtained relatively little recognition. A survey of North American literature reveals only one reference, that of Monias². The test is now employed as a routine in this hospital, and we are reporting our findings as we consider that this test has certain advantages, especially since, as is well known, the colloidal gold test, to which it may to some extent act as an adjuvant, is both difficult to carry out and may, on occasion,

on account of the difficulty of its preparation, give conflicting results.

TECHNIQUE

To 1 c.c. of spinal fluid one drop of 10 per cent Na_2CO_3 solution is added. Shake thoroughly. Then is added 3 c.c. of a fuchsin-sublimate solution, composed of equal parts of 5 per cent corrosive sublimate and 0.02 per cent diamond fuchsin. It is recommended by some authors that the solution be made up just prior to using. Our experience is that on keeping the solution becomes somewhat more sensitive. The reaction may appear immediately or at any time up to twenty-four hours. There are two forms of reaction:—

Type 1 is characterized by the appearance of a woolly blue-violet coloured deposit. The supernatant fluid becomes colourless in strongly positive fluids. Various gradations of this reaction are met with.

Type 2 is characterized by a pinkish colouration of the fluid without the formation of sediment.

The test has been put forward as a substitute for the Wassermann and colloidal gold tests. To us its chief advantages appear to be its rapidity and its simplicity.

In regard to its value as a substitute for a Wassermann test, we have found it to give a negative reaction in 6 per cent of cases where the spinal fluid Wassermann test was positive, and to give a positive reaction in 6 per cent of cases where the spinal fluid Wassermann was negative. Further, the substance in the spinal fluid which causes precipitation in Type 1 appears to correspond with that which causes precipitation in the colloidal gold reaction, as is seen in the following experiments:

These experiments are those which Mellanby and Davies³ carried out on the colloidal gold reaction. These authors found that the precipitating substance in the cerebrospinal fluid, which was destroyed by heating, was precipitated by alcohol and by half-saturated ammonium sulphate.

Experiment 1.—Destruction by heat: Cerebrospinal fluid was heated to 100°C . for five minutes, and the Takata-Ara test then applied in the usual manner. A negative result was uniformly found in fluids which previously to heating had given a positive finding. It is to be noted that where the Pandý test was strongly positive a slight turbidity appeared in the fluid on heating and before application of the Takata-Ara test. This may readily give the erroneous impression that sedimentation was taking place.

Experiment 2.—Precipitation by alcohol: To 2 c.c. fluid were added 4 c.c. absolute alcohol cooled to 0°C . This was then centri-

fuged to bring down the whitish precipitate, which was then dissolved in 2 c.c. of 0.9 per cent sodium chloride. The test was applied to the redissolved precipitate and a positive reaction was obtained. A further 2 c.c. of fluid were taken and 4 c.c. absolute alcohol were added. The precipitate was filtered off, being made up to its original bulk by means of distilled water. The test was then applied and a negative result obtained. Finally, the two phases were combined, the precipitate being recombined with the filtrate and a positive result being obtained on application of the test.

Experiment 3.—Precipitation by half-saturated ammonium sulphate: To 2 c.c. of cerebrospinal fluid was added half-saturated ammonium sulphate. The precipitate occurring was removed and redissolved in 2 c.c. of water. On the test being applied to the redissolved precipitate a positive finding was obtained.

In regard to its value as a substitute for the colloidal gold test we found that it was frequently negative in known cases of general paresis, taboparalysis, and cerebral syphilis where the colloidal gold curve had been reduced to low figures, e.g., 1123221000 by intensive treatment. Nevertheless, there was a certain correspondence between the two tests as will be shown later.

We would urge the adoption of the Takata-Ara test on the grounds of its rapidity and its simplicity. The rapidity was found to be in fairly strict ratio to the intensity of the colloidal gold curve, as will be seen from Table I. Triple-distilled water and special glassware are not required. The test solution can be easily made and kept and can be readily applied. Taking it in conjunction with other spinal fluid tests the Takata-Ara test may be used with caution as a substitute for the colloidal gold test or as a mode of checking up the findings given by the latter.

SPECIFICITY

In regard to the specificity of the reaction there is a certain variance of opinion. Type 1 occurs in cases of general paresis, taboparalysis, and cerebral syphilis. Type 2 occurs in bacterial meningitis, in epidemic encephalitis, and in brain tumours. It is stated (Muenzer quoted by Wolochow⁴) that it is positive in 100 per cent of cases of general paresis, and in 95 per cent of cases of brain syphilis (Takata and Ara). Wolochow gives 90 per cent for active cases of general paresis, 70 per cent for arrested cases. In cases of taboparalysis he gives 80 per cent.

In regard to type 2 little information is available. Monias mentions that it is frequently negative in tuberculous meningitis. In regard to our own findings, in 44 cases of known

TABLE

Case Number	1.	2.	3.	4.	5.	6.
Colloidal gold.	4444432100	4445532100	5555421000	4332210000	5555554210	2223210000
T. R. A. Stat.	Slight precipitation	Slight turbidity	Slight turbidity	Clear	Slight turbidity	No reaction
1 hr.					Almost complete precipitation	
2 hrs.		Slight precipitation		Very slight turbidity		No reaction
3 hrs.					Complete precipitation	
12 hrs.	Some turbidity	Complete precipitation	Complete precipitation			Very slight turbidity
24 hrs.	Complete precipitation			Slight turbidity		Very slight turbidity

general paresis, taboparalysis and cerebral syphilis the test was positive in 36 cases. In all cases where it was negative the other findings had been much reduced by intensive treatment. In two cases we obtained a Type 2 reaction; one was that of a brain tumour, the other was a case of suspected tuberculous meningitis. Our series comprised in all 117 cases. In 73 non-specific cases the result was constantly negative.

EFFECTS OF TREATMENT

The findings in eight cases after malaria were as follows:— In four cases where complete precipitation was present before malaria was given and where the test was applied immediately after cessation of the attacks, no change was noted. In one case there was a change from slight turbidity to a negative result. The remaining three cases showed an increased positivity. The immediate tendency of malaria therapy was therefore to increase the positivity of the reaction. This was in accordance with similar findings in the colloidal gold reaction. The later results were conditioned by the later effects of malaria and intravenous and intramuscular treatment, this latter consisting in neosalvarsan, mercury and tryparsamide. The later findings are as follows. Eight cases, taken at varying periods up to six months, have shown no change in the Takata-Ara test from that found immediately after the malarial treatment had been gone through.

CONCLUSIONS

1. The Takata-Ara test is of value because of its rapidity and simplicity.
2. The rapidity of its appearance bears a fairly definite ratio to the intensity of the colloidal gold reaction.

3. It would appear that the factors producing the colloidal gold and a Takata-Ara reaction are somewhat similar, but that the colloidal gold reaction is more sensitive.

The test is positive in 70 to 100 per cent of cases of neurosyphilis, the percentage depending on the acuteness of the disease.

The authors are desirous of acknowledging their indebtedness to Dr. C. A. Baragar, Superintendent of the Hospital, for his permission to utilize the clinical and laboratory resources of the Hospital in the preparation of this paper.

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MILK: USE OF A DIFFERENTIAL STAIN IN THE DIRECT ENUMERATION IN PASTEURIZED MILK

Dead bacteria, stained previously by Loeffler's blue, lose the blue colour and become red under the influence of a 10 per cent solution of carbolfuchsin poured rapidly over the preparation. Treated by the same process, the bacteria of a living culture do not give up the blue dye which they have fixed. The variable cyanophilia of bacteria, corresponding to their vitality, appears in a more certain manner if the following mixture is used to stain preparations fixed by moderate heat: Concentrated fuchsin (Ziehl), 8 c.c.; distilled water, 100 c.c.; Loeffler's blue, 100 c.c. The colouring mixture ought to remain for 24

hours exposed to the air before being used. It is sufficient to stain during one minute and to wash in water in order for the differential colour to appear; blue for the living bacteria and red for those which are dead.—M. Beattie, *Am. J. Pub. Health*, 17, 1031. Abs. in *J. of State Med.* 37: 367, 1929.

DIFFERENTIAL BLOOD CULTURES

Differential blood cultures are simultaneous blood cultures taken from vessels in several different parts of the body. By counting the number of colonies per cubic centimetre of blood in each vessel, it is hoped to establish from which region the bacteria are entering the blood. That the principle is correct is shown by a study made by Reuben Ottenberg, of twenty cases of sinus thrombosis or phlebitis, proved at operation or at autopsy. The principle can undoubtedly be applied to other regions of the body. In a case of suspected sinus thrombosis the finding of a much greater number of bacteria in the blood of one internal jugular vein than in the other confirms the diagnosis. But it is impossible from the count alone to tell on which side the thrombosis is located. The finding of large but equal numbers of bacteria in the two internal jugular veins with a much smaller number in an arm or leg vein also confirms the diagnosis of sinus thrombosis. Totally negative blood cultures from all three veins do not rule out sinus thrombosis. Mild cases of sinus phlebitis in which recovery can occur without tying off of the jugular vein or operative opening of the lateral sinus may occasionally cause a bacteraemia of the same type as that in the severe cases. Transient post-operative bacteraemia is not infrequent (perhaps the result of transient phlebitis) following operations on the mastoid region in which the lateral sinus has been exposed at operation. The finding of approximately equal numbers of bacteria in the two internal jugular veins and in the arm or leg vein indicates that the bacteria are not coming from the regions drained by any of these veins. In the author's limited experience (five cases) this finding occurs regularly in bacterial endocarditis, but one might expect it in many other clinical conditions,

such as pneumonia or kidney suppuration. From the observations presented it is evident that the lungs and liver filter out enormous numbers of bacteria, so that relatively few of the bacteria which get into the blood stream ever reach the periphery. It would seem, therefore, that in the study of obscure infections blood cultures should be made, wherever possible, from a vein directly draining the involved region. This principle should be applicable to the study of focal infections. The possibility exists that sudden liberation of a shower of bacteria from an infected focus can cause errors in the interpretation of differential blood cultures. It is recommended that for future investigation the multiple cultures be made as nearly as possible simultaneous. The observation that there are sometimes no bacteria detected in the blood of the arm vein, although there are bacteria in the veins directly draining the lesion, leads to the conclusion that the new type of blood cultures ought to be taken early in suspicious cases without waiting for a report of a positive result from an arm vein.—*J. Am. M. Ass.*, 94, June 14, 1930.

A GENERAL METHOD FOR MALLORY'S TRIPLE STAIN

Miss E. E. Hewer, D.Sc., lecturer in histology at the London School of Medicine for Women, writes: In the *British Medical Journal* of February 15th (p. 82) Dr. MacConaill outlines a general method for Mallory's triple stain, again emphasizing the fact that the material need not be fixed in a sublimate mixture. In a paper published in June, 1926, in the *Journal of the Royal Microscopical Society*, and entitled "The effect of fixative on staining reaction," I drew attention to the fact that Mallory's triple stain can be used after such fixatives as formol, formol saline, formol-acetic-Müller, Bouin, and neutral formol-Müller, with only slight variations in the colour reactions obtained. In view of the fact that this staining method is of such value, it is most regrettable that text-books still continue to copy the statement as to Zenker fixation, in spite of the well-known excellent results of using other fixatives.

SYPHILITIC AORTITIS.—R. Fischer refers to the increasing number of cases of syphilitic mesaortitis recorded in recent years, and recognized generally as one of the most malignant diseases of the circulatory system. He has treated about fifty cases both as out-patients and in the wards, as well as a similar number of private cases. The average length of life after the disease was diagnosed was about two years. Fischer describes two cases of early pulmonary tuberculosis in which skiagrams revealed, in one case, aortic dilatation, and in the other a sacculated aneurysm; both patients had a positive Wassermann reaction. Even under early

and energetic treatment cure is impossible, but the syphilitic infiltration of the media may be arrested. A great danger is that the scar tissue may invade the ostia of the coronary arteries. The author has seen serious results follow the non-specific increase of the effect of salvarsan—for example, when milk has been injected simultaneously—and death occurred in one case after stovarsol treatment. He has given iodides in many cases, but considers that their utility is doubtful, energetic neosalvarsan treatment being recommended as the most rational method.—*Wien. klin. Woch.*, p. 599, May 8, 1930.

Editorial

THE WINNIPEG MEETING

THE great event for which our western brethren have been planning for the past two years has come and gone. It is just thirty-three years ago since Winnipeg extended its invitation to the British Medical Association to meet in that city. At that date, 1897, the Association was meeting in Montreal, outside the British Isles for the first time in its history. Winnipeg seemed "a far cry," then, and when next the Association met in Canada it was in Toronto in 1906. But at last the desire of the medical profession in the "hub" of Canada has been gratified. Much water has flowed under the bridge during the last generation. Winnipeg has become an important medical centre, with a first-class medical school; transportation is now simplified, and distance is not now so important. Some hesitation was expressed as to the outcome, on account of the prevailing hard times and the distance to be covered, for distance always bulks larger in the minds of our English relatives than it does in ours. It may be said at once that, despite these fears, the ninety-eighth Annual Meeting of the British Medical Association, combined for the occasion with that of the Canadian Medical Association, was an unqualified success. Much of this success is to be attributed to the team work of the officials of the two Associations, and the energetic efforts of the excellent local committees. The President, Dr. W. Harvey Smith, proved a tower of strength, and his genial presence, together with the gracious personality of Mrs. Smith, did much to ensure the smooth and happy working of the machine. Not only the visitors but the Canadian profession owe much to them.

In regard to the meeting itself, if one were to select an adjective that would seem particularly appropriate it would be "colourful," and this not only in a metaphorical but in a literal sense. From the opening meeting on Tuesday, when the members were posing and imposing in their aca-

demicals, to the Afternoon Tea at Lower Fort Garry on the last day, when the proceedings were enlivened by the songs and dancing of groups of Ukrainians and Poles in their gala native costumes, colour ran riot. The Indians and the new Canadians of central European origin were decidedly attractive features, and it may be doubted whether any city in Canada could have surpassed or even equalled Winnipeg in the quality of the entertainment provided.

The program of scientific papers was sufficient. In accordance with the British custom, only one or two matters, but those of present importance, were discussed at each sitting. The various topics were thus handled fully and in an authoritative way, leaving little to be desired. Canadians and British Islanders, and other Imperials met on common ground, and exchanged ideas. The result was happy. Sometimes Canada led the way, but sometimes, also, as one speaker put it "Canadians were too modest," and perhaps did not lead when they might have done so. Still, this is a fault, if it be a fault, on the right side.

The people of Winnipeg were hospitality itself. Everything was done to accommodate and entertain the visitors, and many friendships were made.

Many of the visitors from the Old Land went through to the Coast, and thus would obtain a fairly adequate idea of the length and breadth and resources of Canada. Canada is no longer a *terra incognita*, and we hope, has proved attractive enough to bring the British Medical Association to our country again before many, so many, years have passed. We may express the hope also that in 1932, when the British Medical Association celebrates the centennial of its foundation, it may be found possible for us to unite again with our colleagues in the Old Country in the meeting in London.

A.G.N.

EDUCATION OF THE PUBLIC IN HEALTH MATTERS

UNTIL the bacteriologists built up our modern knowledge regarding the transmission of disease, attention was fixed upon the influence of man's environment on the occurrence of disease. Then followed a new system of quarantine based upon a better understanding of the cause and mode of transmission of the various communicable diseases. This newer system was limited in its effectiveness because, on account of the infection that is spread by mild and missed cases and the carriers occurring in certain of the communicable diseases, isolation of cases is not sufficient to control communicable diseases.

An understanding and appreciation of the limits of the effectiveness of legal regulations led to recognition of the fact that it is only through education that progress may be looked for beyond what is secured through those activities which the group rather than the individual can accomplish. Through community action, a sanitary environment is secured, as are also safe water and pure foods. To a greater or less extent, certain diseases may be controlled or their number reduced by action of the community in dealing with insects and with infected animals or persons. Desirable as such activities are, and fruitful as they may be in the control of disease, they make but little contribution to the positive side of health work, which aims to secure a maximum of healthful years as a result of hygienic living. If the individual is to live a hygienic life, it follows that he must be educated with regard to health. Education begins with instruction or study. During the past years, there has been a vast amount of health instruction given, some sound, some not entirely reliable, and, unfortunately, a considerable amount without any scientific basis, being simply the outpouring of individual opinions which are often erroneous. Instruction is necessary. A certain amount of actual knowledge on health subjects should be the common possession of all the people. The frequent reiteration of some fact results in action for the benefit of those who respond. The frequently repeated statement that diphtheria can be prevented has led and is leading many parents to have their children im-

munized against diphtheria. It should not be thought, however, that health instruction is the beginning and end of health education. The individual who has learned a large number of unrelated health facts, even if he puts them into practice, can hardly be thought to be educated in health. Education in health implies that the person instructed has been brought to desire health and to have an understanding of the meaning and significance of the health facts which have been given him by instruction.

A mother may breast-feed her infant because she has read and has been told on many occasions that this is the right thing to do, that it is better for her baby than is artificial feeding. But if the mother does this in what might be called a mechanical manner, without any understanding of why natural feeding is desirable, she cannot be said to be educated with regard to breast-feeding. The modern health department understands this, and follows up its printed instructions by the personal educational visits of the public health nurse. The public health nurse, in her contacts with the individual, seeks to emphasize by demonstration the instruction already given through the printed word, and to arouse an interest in and understanding of the facts.

The Canadian Medical Association provides instruction through its Health Service.

It is hoped that, in many cases, this service goes beyond what is merely instruction, that it fosters a desire for health in its readers. The completion of the task of the education of the public in health rests with the medical practitioner. He it is who can bring the individual to think for himself on the subject of health, to ask questions regarding his own health problems, and to seek an understanding of them. This cannot be accomplished through publications alone; the responsibility rests with the personal teacher, and, in most cases, this will be the family physician in his contact with the individual or the family. The public are coming to think of the family physician as the health counsellor of the family, and this implies that he will be their health teacher and that he will complete their education in health.

A. GRANT FLEMING.

OUR GROWING DEPENDENCE ON THE X-RAY

THE value of radiology in the diagnosis of diseases of the chest was the subject of discussion at a recent branch meeting of the British Medical Society in Sydney.¹ The occasion afforded an opportunity for the expression of points of view which, as one speaker epigrammatically remarked, included that of the physician with a guarded admiration for the radiologist, and of the radiologist with no admiration for the physician! That of course does not describe the average viewpoint; it would be unfortunate if it did. It does, however, reflect to some extent the stages through which medical opinion has passed, or is passing, with regard to the place of the x-ray in the diagnosis of thoracic disease. Cabot, for example, writes in the latest edition of his "Physical Diagnosis:"²

"Many radiologists believe that they can detect the presence of tuberculosis in the lung by radioscopy at a period at which no other method of physical examination shows anything abnormal, but postmortem results rarely in my experience support this belief. In *incipient* tuberculosis the x-ray as often leads us wrong as right."

Evidently he is not to be placed amongst the "guarded admirers." Nor is Morriston Davies, who writes.³

"It (radiology) has also, however, helped for the time to confuse us by showing us the shadows known as "pleural rings," and those changes at the root of the lung which have given birth to the nomenclature of "hilum tuberculosis."

At least two other writers speak of "the pathetic constancy" with which the radiologist diagnoses tuberculosis,^{4,5} and Sir Thomas Horder is quoted⁶ as referring (with harshness indeed!) to the "bastard pathology" of the radiologist.

But the radiologist has his turn: witness Dr. Gerald Webb on the diagnosis of early tuberculosis.⁷ He says,

"Roentgen examination is the only method available for detecting early pulmonary tuberculosis.....with the improvement in the technic in the use of x-rays and the taking of serial films it is now recognized that the early lesions of pulmonary tuberculosis are frequently deep seated and discrete."

Then there are the impressive conclusions of Dr. L. H. Fales:⁸

"From a study of 411 cases, 60 per cent of which were found to be tuberculous, we believe that the Roentgen-ray is the most important means of determining the existing pathological condition of the lungs.....In a certain percentage of cases (11 per cent) the Roentgen-ray will show a lesion not demonstrated by physical signs."

Statements such as these might be multiplied, but the radiologist really needs very little support. He must be a very bold, even foolish, clinician, who will always back his judgment against what the x-ray can teach him. Where is the hospital which cannot show radiographs of pulmonary cavitation whose presence had at best been only hinted at in the physical examination, but not diagnosed: or of foreign objects in the lung whose manifestations had for years been translated as those of tuberculosis?

Only one way is there to our salvation, and on its guidepost is that most blessed word "co-operation." Let the physician admit his ignorance of a technical procedure in which he has no more right to claim accurate judgment than in any other specialty outside of his training; and let the radiographer qualify his diagnoses by allowing not only for the errors of still not quite perfect mechanical methods, but also for his not possessing the immensely important factor of the history and clinical course. Then will these two be as complements to each other, with resulting fixation of diagnosis.

The more one sees of the x-ray the more convinced one becomes that it will often provide information with an accuracy to

1. *Med. J. Austral.* p. 800, June 21, 1930.

2. Tenth Ed. p. 297, 1930.

3. *Brit. M. J.* 2: 235, 1927.

4. CHANDLER, *Brit. M. J.* 1: 469, 1928.

5. NICHOLSON, *Ibid.* p. 572.

6. STEWART, *Med. J. Austral.* p. 647, Dec. 5, 1925.

7. *J. Am. M. Ass.* 92: 1811, 1929.

8. *Am. J. M. Sc.* 172: 382, Sept. 1926.

which the physical examination does not attain. But it must not be depended on as a short cut. It is an added source of information, which may confirm, or correct, or

amplify a diagnosis. But it may fail to do any of these things. In any case, it must never be allowed to supplant the good, careful clinical examination. H.E.M.

ANÆSTHESIA DURING CHILDBIRTH

AMONG the many papers which have appeared recently in both the British and American medical press deploring the unnecessarily high mortality rate connected at present with childbirth, several have appeared calling attention to the advantageous influence exerted by the employment of anæsthesia in labour. In a previous report from the Departmental Committee on Midwives of the British Medical Association¹ it was stated that it would be to the public interest if some professional body would issue at an early date a pronouncement as to the advisability and place in labour of anæsthetics and sedative drugs generally. In response to this request the Council of the Association set up a special Committee to report on this matter, and its report² appears in the Provisional Report of the Committee on Maternal Mortality and Morbidity to the British Medical Association. In this report the Committee states that it considers that light intermittent anæsthesia may be administered to a greater extent than has been the custom up to the present time in normal cases, particularly in primiparæ. Such administrations should in their view be limited to the latter part of the second stage of labour and should be undertaken by the doctor only.

We note also, that in a recent editorial of the *Lancet*, the writer claims that, quite apart from the humanitarian aspect of the question, the employment of an anæsthetic during labour, if such anæsthetic is carefully chosen and carefully administered, need offer no difficulty, and undoubtedly affords the mother comparative freedom from shock and exhaustion, and consequently renders her less liable to the development of any puerperal infection. To many women also the memory of the unrelieved pain of a first labour acts as a severe depressant as the

prospect of a second approaching ordeal faces her, and forms an additional strain definitely prejudicial to the welfare of both mother and child.

In the meanwhile the matter has been taken up by several public minded ladies, and appeals have appeared in the lay press of Great Britain urging the establishment of a fund sufficient to assure to every British woman during childbirth the relief afforded by a carefully given anæsthetic.

The special drug to be employed to produce anæsthesia during labour must always be a matter of careful consideration and in a recent number of the *British Medical Journal* a paper by Mr. Bourne and Dr. Burn reports an investigation of the exact action of some of the more important anæsthetics on the activity of uterine muscle at this period. The apparatus employed in this investigation was a comparatively simple one. It consisted of a disc-shaped rubber bag attached to the end of a gum elastic catheter, and connected by a long rubber tube to a mercury manometer. When the bag and tube are filled with water small changes of pressure exerted on the bag are accurately transmitted to the manometer and recorded on the surface of a slowly moving drum. The most careful aseptic precautions are necessary. As soon as labour has definitely commenced and the os is dilated to a diameter of about an inch the bag is to be inserted beneath the membranes and the wall of the uterus in a position well past the head. By the aid of this apparatus the effect of the special drug on the behaviour of the uterus is demonstrated. Their conclusions are as follows: The administration of both chloroform and ether have a tendency to slow and temporarily arrest the contractions in their first stage, and diminish their force and frequency in the second stage. The effect comes on rapidly as the stage of anæsthesia increases, and passes off rapidly when the administration is discontinued or

1. *Brit. M. J.* 2: 592, Sept. 1929.

2. *Lancet* p. 368, Aug. 1930.

diminished. The administration of gas with oxygen on the other hand has little action on the contracting uterus. The investigators state that gas and oxygen used as an anæsthetic produces an anæsthesia which does not interfere with the process of labour. Stovaine given by spinal injection does not interfere with the rhythm of the main uterine contractions, but relaxation is never complete as in normal labour and a more or less persistent contraction of the lower segment may interfere with the dilation of this portion which normally occurs and may thus interfere with progress of the head. Morphine lessens the frequency of uterine contractions, but the pains pass off more slowly so that the work done by the uterus is probably as great, or even greater, than before. Atropine appears to stimulate the contractions of the uterus, and certainly has no inhibitory action. In their experience there was no clear indication of any definite stimulation of the uterine contraction by quinine. This pioneer work of Mr. Bourne and Dr. Burn initiates a new and valuable method for testing the action of an anæsthetic. In closing their article, however, they emphasize the opinion that in midwifery the physician must use judgment and vary the depth of anæsthesia employed. Light anæsthesia is

commonly all that will be required until the end of the second stage, but full surgical anæsthesia may be demanded towards its close. While the amount of chloroform to be given should be small, the reduction in the force of the contractions under chloroform may often be of benefit in avoiding perineal tears.

Experience at Queen Charlotte's Hospital indicates that there has been no appreciable prolongation of the second stage under this form of anæsthesia, or any increase in the frequency of the use of the forceps. Objections have been made by many to the use of chloroform or ether throughout the whole of the second stage, and the use of gas and oxygen has been urged by Boyle who states that patients are far less exhausted after gas and oxygen than after chloroform and the pains are not interfered with. We fear that in domiciliary practice at any rate the difficulties attendant on the necessary apparatus will interfere greatly with its routine use. When full surgical anæsthesia is required ether should be substituted for chloroform and its use combined with hypodermic injection of atropine. It is to be remembered however that ether is highly inflammable and the risk of explosion in an ill ventilated room with an open gas fire is considerable. A.D.B.

Editorial Comments

LONGEVITY AMONG COLLEGE GRADUATES*

In an interesting article which appeared in the *New York Times* of July 20th, Louis I. Dublin, statistician of the Metropolitan Life Insurance Company, calls attention to the fact that college graduates as a group both in youth and middle age have a greater expectation of life than other classes in the community; among the general graduates honour men have the superior expectancy in length of life, while the athletic group fall somewhat below the average. Heredity and environment have certainly an influence on individual lives. So-called robustness of physique in Dr. Dublin's opinion does not make for longevity, and a mere college education does not necessarily prolong life, but a scholarly education makes for conservative living. Dr. Dublin presents the following brief table in proof of his statement and as showing the dif-

ferences in the expectation of life between college men (classes 1870-1905) and selected and insured men in America, and in New Zealand.

	Expectation of life (in years)	
	At age 22	At age 52
Athletes	45.56	20.86
Graduates generally	45.71	21.43
Honour men	47.73	22.79
Insured men, 1900-1915 (American men ultimate table)	44.29	19.79
New Zealand males, 1921-1922	46.91	21.95
United States white males, 1901 (original registration states) ..	40.71	19.40
United States white males, 1926 (registration states of 1920) ..	43.46	19.23

These figures do not come as a great surprise to men who have closely studied occupational mortality among insured lives. In insurance ratings and classifications of occupations the scientist and the clergyman show greatest longevity. A scientist has an inexhaustible life interest. His problems are never settled. There

* Abstracted from article in *How to Live*, September 7, 1930.

is always something round the corner to search for. Health experts have long tabooed the ideal of mere muscular development. Unless constant exercise is taken a set of heavy muscles too often constitute merely parasitic growths that have to be supported with considerable drain upon vitality and human economy.

All records available point to the fact that the highly intelligent conservative class has the lowest mortality in the community. The problems of human living are extremely complex and one must not be too dogmatic in laying down absolute rules. There is strong support in these figures for the thesis that after all the longest lives are usually the lives most conservatively lived. Long life, however, regardless of its interest, achievement, and zest, is not the highest ideal to be set before the public. Dr. Dublin's figures will doubtless be the subject of much debate but they form a definite factual basis which will be difficult to overthrow.

A.D.B.

IMPROVED METHODS IN TREATING DIABETES

The treatment of diabetes sets us many problems, not the least of which is that of making up a diet that will both meet the metabolic requirements and be as attractive as food ought always to be. Dr. Rabinowitch has dealt with this problem in our present issue. In essence, the solution that he puts forward is to give more carbohydrate and less fat. We have gone a long way beyond the days of rigid exclusion of carbohydrate from the diabetic menu; with the help of insulin we have been able to give it in amounts which would have been severely condemned not more than ten years ago. But Dr. Rabinowitch has asked himself whether the other two legs of the dietary tripod, namely fat and protein, may not be capable of such adjustment as would bring even more variety to the food and perhaps allow of less dependence on insulin. For after all, the ideal method of treating diabetes must always be by regulation of diet, rather than by the use of an artificially added internal secretion.

We do not wish to do more here than to call attention to this new modification of diabetic treatment. It is based on experience with a group of carefully controlled cases in hospital, and affords much encouragement towards further trial.

H.E.M.

ON THE VITAMIN CONTENT OF APPLES

Interest will be taken in a recent report by Bracewell Hoyle and Zilva and issued by the Medical Research Council on the anti-scorbutic vitamin in apples.* The work de-

scribed aimed at gaining increased knowledge of the nature and properties of the vitamins themselves. Several facts of general interest, however, have emerged. It appears from their investigation that there are great differences in the vitamin C content of different types of apples; one British type in particular being far richer than any of the other kinds tested. This difference seems to be entirely dependent upon the species of apple itself, and not upon the age of the tree, the soil upon which it is grown, or the time of year at which the fruit is gathered. In their investigations they determined that cold storage had only a slightly deleterious effect, and roasting apples in their skins destroyed the vitamin only to a negligible extent. The exact reason, however, why one species of apple should contain so much more of the vitamin C than others has not been discovered. It is however well recognized that while lemons are rich in vitamin C limes are poor; and all will remember how the substitution of lime juice for lemon juice in the British Navy had disastrous effects. In some recent Continental work, equally striking differences in the amount of the vitamin contents of several closely allied fruits have also been demonstrated.

The other vitamins seem to be pretty widely and evenly distributed. Vitamin A can be found in any liver oil, vitamin B in most green vegetables, while vitamin D is formed when ultra violet light acts upon ergosterol, and it is also apparently widely distributed. Closely associated with these facts is the also remarkable fact that of all the common laboratory animals the guinea pig is the only one which appears to be susceptible to a deficiency of vitamin C and, therefore, the only one that can be used in experiments for investigating its amount, thus greatly increasing the difficulties and expense entailed in testing for it.

A.D.B.

STANDARDIZATION OF D VITAMIN

The Medical Research Council's* committee also calls attention to the fact that a standard for testing the amount of the anti-rachitic vitamin D has been prepared. In testing for the actions of a vitamin in which the result obtained is based on the correction of an abnormal condition produced by a diet in which it is deficient, determination must be made on a strictly comparative basis. As was recently emphasized by the committee any unit or standard based directly on the response of the experimental young animal to the administration of anti-rachitic material is liable to be unsatisfac-

* Medical Research Council, Special Report Series 146, H. M. Stationery Office, 1930.

* *Lancet* p. 503, August 30, 1930.

tory owing to the disproportionate reaction of the standard in apparently similar animals in response to equal dosage. Hence the vitamin D unit should preferably be referred to a stated quantity of some standard material.

The discovery of a method of producing this vitamin artificially from ergosterol has led to its manufacture on a large scale, and to its issue in many forms for therapeutic use. The need for a common basis of measurement is therefore accentuated, and the provisional unit adopted in the Pharmaceutical Society's laboratories as a test for the vitamin D content of the material submitted to them, has been based on material supplied to them as a standard for this purpose by the National Institute for Medical Research. As the amount of this material prepared at that time was too small to permit general distribution it has been freshly prepared under very careful supervision on a scale sufficient for its distribution to laboratories or institutions likely to

require it. Evidence of its stability over a period of at least two years, if maintained at or below zero of Centigrade has been determined. The quantity of the standard solution available at the present, although not large enough to allow it to be distributed in large quantities, will permit its distribution in moderate quantities to institutions which have the staff and equipment necessary for its accurate use in biological assay. Application by those desirous of obtaining some should be made promptly to the Director of the Department of Biological Standards, National Institute for Medical Research, Hampstead, London, N.W-3. A.D.B.

ERRATUM

In the editorial on "Overweight and Longevity" (August) it was stated that the number of individuals included in the study numbered 19,304. This should have read 192,304.

Special Articles

THE CENTENARY OF THE ACHROMATIC LENS

By W. H. HATTIE, M.D., C.M.,

Dalhousie University,

Halifax

Just one hundred years after Christopher Columbus made the memorable voyage which disclosed a new continent to the civilized folk of his time, Hoefnagel published his "Arche-typa" in which, a quite novel feature, he illustrated small objects by enlarged drawings which had been made with the aid of the magnifying glass. This was an event of no small significance. Of course lenses had been used for purposes of magnification long before that. In the first century Seneca noted that a glass globe filled with water could be used to make small letters appear large and distinct, and doubtless a very similar statement could have been made by many a gem cutter of still earlier times. We are by no means sure when the water-filled sphere was first used in magnification, nor can we speak with greater certainty relative to the date when the solid lens began to find use in preference to it.

Roger Bacon is often credited with the discovery of spectacles and with a description of the use of what is now called the microscope. This takes us back to the thirteenth century. Doubtless spectacles were really employed long before Bacon's time. And it was not until the seventeenth century was well advanced that the

microscope claimed the serious attention of students of biology and thus came into a service which related it to medical advance. Nor was it until 1830, when Joseph Jackson Lister, father of the revered Lord Lister, succeeded in making a satisfactory achromatic lens that the future of microscopic work was assured. The centenary of so notable an achievement suggests this brief sketch of the early history of the microscope.

The simple microscopes such as Kircher devised, after a somewhat unsatisfactory experience with still earlier models, were merely contrivances which steadied a single lens and the object under examination and made primitive provision for illumination. While a compound instrument had advocates even in Kircher's time because of the greater magnification it gave, chromatic aberration was so marked and the field was so restricted in this instrument, that the simpler device was the more popular for many years. Kircher, the first microscopist of note, did much of his work with a 32-power instrument which he called the *smicroscopium*, and this revealed wondrous new worlds to that diligent versatile priest and physician. There is reason to believe, however, that in the experiments described in "Scrutinium Pestis" (1658), in which he attributed plague to a *contagium animatum*, he used a compound microscope.

Leeuwenhoek, who gave much of his skill and industry to grinding and polishing lenses as well as to the production of a more serviceable "stand," probably never used a compound instrument, but he accomplished marvels with

his simple microscopes—of which, it is said, he possessed two hundred and forty-seven. Incidentally, he presented twenty-six of them to the Royal Society, of which he was elected a Fellow in 1680—not because of his generosity, but in recognition of his contribution to science. To him belongs the distinction of being first to give a complete description of the red blood cells (although Swammerdam had anticipated him by a less perfect description), first to discern protozoa, and first to present accurate drawings of bacteria.

Malpighi, generally regarded as the greatest of the earlier microscopists, who gave the first account of the embryology of the chick, relied mainly on the simple instrument, but it was with the compound instrument that he observed the capillary circulation in the lung of the frog and thus confirmed the accuracy of Harvey's contention. It is interesting to recall that Malpighi was born in the year in which Harvey published "De Motu Cordis," and it was not until a few years after Harvey's death that Malpighi saw the blood cells passing through tiny capillary vessels. Although it is commonly believed that Harvey did not use the microscope, D'Arcy Power tells us of a portrait of Harvey in which a bilenticular microscope similar to that designed by Descartes (1637) appears in the background. However much or little use Harvey may have made of the instrument, the conclusive evidence he desired so much was withheld until Malpighi unleashed it in 1660. Of the capillaries Fraser-Harris says: "Harvey made their existence a logical necessity; Malpighi made it a histological certainty."

These are but instances in the early history of microscopy. We may well marvel at the accomplishments of the earlier devotees of the art. It is a far cry from the simple instrument of Kircher to the ultra-microscope of our day. Had instruments comparable to ours been available to these pioneers, we can fancy that they would have produced results which our modern investigators would have difficulty in paralleling. They mastered the general principles of microscope construction, but it was long before they solved the problem of making satisfactory lenses. As has been noted, it is just a hundred years since the elder Lister succeeded in constructing an achromatic lens which marked an improvement of such magnitude that we can scarcely overestimate its importance. Until that improvement had been effected it was quite impossible to go forward either to an unequivocal demonstration of the bacteria and other minute organisms which play so important a part in pathogenesis, or to other revelations which have profoundly influenced our conception of natural processes. We may feel, therefore, that the year 1830 is

one which marked an advance of great significance to Medicine, and should remind ourselves that there is more than one Lister to whom we owe much of our present ability to control sickness and suffering.

THE CHINESE PHARMACOPŒIA

BY BERNARD E. READ,

*Peiping Union Medical College,
Peiping, China*

The Board of Health of the Nanking Government has prepared a modern pharmacopœia based upon scientific standards. This is in the press and sometime in the near future may be expected to appear for official use. It represents a praiseworthy effort to bring law and order where formerly such was non-existent, except in so far as ancient custom was observed and modern medical institutions strove to sustain the standards of their foreign founders.

A national pharmacopœia will bring definite standards into the Chinese drug market; it will further nationalize the numerous foreign hospitals; and will eventually provide a mechanism whereby the practitioner, the pharmacist, and patient in China may secure reliable materials. Up to the present such has been sustained by foreign firms representing almost every nation of the west, who, though they have introduced good standards, have brought such varying standards that it became essential to introduce one common national standard for China. More important, however, is the implied approval that this pharmacopœia gives to certain reliable modern remedies. China is flooded with proprietary medicines which need to be controlled and checked. The proper establishment of modern medicine on a scientific and legal basis will provide the necessary machinery for the formulation of modern poison laws, reasonable drug tariffs, and modern food and drug acts.

It will be of interest to foreign countries to see how China has brought together the present pharmacopœia. The British Pharmacopœia was translated into Chinese and published under the joint auspices of the London Chamber of Commerce and the British Chamber of Commerce in 1927. It was thought by some that as Japan in 1886, copying the German Pharmacopœia, first started her publication, so the Chinese might freely copy the recent British translation. However, they were unable to follow such an easy procedure, chiefly because the majority of modern practising physicians are Japanese trained, and there are many others trained in America, Germany, and France.

The *National Medical Journal of China*, in

February, 1929, expressed the hope that China might adopt the standards of the proposed International Pharmacopœia and confine itself to the metric system of weights and measures. The latter has been carried out, but with the former ideal proposal still an indefinite quantity, the compilers were compelled to adopt more practical measures, namely, to seek for standards for those drugs in use by modern practitioners. These standards have been largely borrowed from four sources which may be discussed under their respective headings.

British standards.—Apart from the numerous well known drugs found in all modern pharmacopœias, the British, in contrast with the American, have retained a greater number of galenical preparations. This quality reflects something of the nature of the practice of medicine in the two countries, the British having retained more of the art of prescribing, while the Americans, in striving for scientific accuracy, have leaned toward therapeutic nihilism. The chief compiler of the new Chinese Pharmacopœia was Mr. Moody Meng, a Major graduate of Bloomsbury Square, London. It was natural that with the numerous medical schools in China founded by British doctors that he should provide these galenical standards which have already come into general use. For example, where America has only 5 official liniments, and Britain has 15, nine have been adopted in the Chinese Pharmacopœia. Syrups of codeine and glucose are taken from the British Pharmacopœia, and the tinctures of cannabis, hydrastis, senega, quiniæ ammon., and quillaia.

There are some drugs which represent British practice, such as eucaine, calcium hypophosphite, potassium sulphate, ammoniated citrate of iron, etc., the irrational use of which in some cases the late Professor Cushing deplored, but usage demands satisfactory legal standards, so they have been included.

American standards.—The most striking thing from the United States Pharmacopœia is the adoption of the most rigid biological standards for such drugs as aconite, digitalis, adrenalin, insulin, etc. Seeing that China has as yet neither the men nor the laboratories for maintaining these standards, nor the drug manufacturers for producing them, she is dependent for the present entirely upon foreign groups. Young pharmacologists are developing and before long the government is likely to establish its own biological laboratories, for the very fact that long transport and storage are involved makes the need for this greater than otherwise.

There are a number of the newer remedies in the United States Pharmacopœia X which

have been adopted, thereby rescuing such products from commercialization and the patent market. This includes arsphenamine, carbon tetrachloride, cinchophen, dichloramine, neo-arsphenamine, phenobarbital, procain, thyroxin, etc.

With the extensive need for bowel remedies in the Far East, there is included albuminis tannas, aspidium, cusso, emetin, granatum, kaolin, etc.

Four serological products are included, antitoxinum diphthericum, antitoxinum tetanicum, T.A.B., and smallpox vaccines, with United States Pharmacopœia standards. The National Epidemic Prevention Bureau at the Temple of Heaven, Peiping, has made excellent progress for several years in manufacturing and standardizing such products. It is to be expected that in this field China will sustain the very best standards.

German standards.—The German chemist was responsible for introducing an unusually large number of synthetic remedies into modern medicine. The market is full of hypnotics, local anæsthetics, analgesics and antiseptics. A careful selection of the more important has been made, for many of these preparations have only a transient popularity, and are found not to be superior to other remedies in common use. Alypin, papaverine, and pyramidon have been adopted, together with many others which are now universally used, such as phenacetin and antipyrine. Pure organic compounds occupy the largest place in a modern pharmacopœia; more than 25 per cent of the 670 drugs in the Chinese Pharmacopœia are in this class.

The German tests and descriptions of this class of drug have in many cases been closely copied by the Japanese. So that while British-American standards predominate for the vegetable and animal materia medica and their preparations, the German-Japanese chemical tests are more commonly used. This group retains several compounds usually regarded as chemicals rather than drugs, *e.g.*, oxalic acid, pyrogallie acid, ethyl bromide, bromine, and sodium hydroxide.

The German-Latin names of drugs are frequently different from the Anglo-American names. The titles and text of the Chinese Pharmacopœia are in Chinese, with the addition of both styles of Latin names. Sodium chloride has the English-Latin title of "sodii chloridum", and the German-Japanese Latin title of "natrium chloratum". Potassium chlorate is termed, "potassü chloratum" in the B.P., and "kalium chloricum" in the P.G. It is readily seen how confusing these terms may become for a third party where both sets of terms are in common use. This is not a problem for English-

speaking peoples, so we will not further labour this point, except to indicate how just such complexities have led to the urgent need of a standard Chinese terminology.

Japanese standards.—National sentiment has been too strong to allow the Chinese to adopt wholesale the Japanese Pharmacopœia. Even in terminology, where the written character might be the same, there has been no slavish following of Japanese ideas. The Japanese transliterate many Western names and sounds. For such cases as are absolutely necessary the Chinese have made an independent transliteration, though there is the tendency to correlate new terms with old ones, *e.g.*, hyoseyamus may be rendered in character representing the sounds "hai-ou-sai-ah-mu-ssu", or one may adopt the old Chinese term "lang-tang", which is the name for the native plant.

It is of considerable interest to find some 60 drugs included which come from old Chinese *materia medica*. Practically all of them are already well known; things like camphor have been employed in Western medicine for many decades; and ephedra has received world-wide attention during the last few years. Aloes, benzoin, gamboge, rhubarb, cardomums, ginger,

and star anise are in universal use. In their knowledge and use of such, old and new medicine in China show little difference, though for many years modern druggists have had the erroneous idea that English rhubarb was superior to the best Szechuan product which is regarded so highly in the West, and one repeatedly found institutions buying back from Europe and America these same drugs which had been bought from the Chinese market.

Of greater importance has been the adoption of oriental standards for new species of drugs. These standards are taken for the most part from the Japanese Pharmacopœia, and apply to Chinese senega, gentian, mint, almonds, cantharides, capsicum, cinnamon, etc. These are oriental species of common drugs, which may well conform to a broad international standard when such has been satisfactorily agreed upon. They should not be regarded as a sentimental leaning toward ancient medicine, for it is to be noted that China has not followed the unscientific path of Mexican medicine with its pharmacopœia of over 2,000 headings. The new pharmacopœia contains about 670 drugs closely allied to the four pharmacopœias cited, each of which contains 600 to 800 drugs.

Men and Books

THE ELEVENTH EDITION OF OSLER'S TEXTBOOK OF MEDICINE*

By H. E. MACDERMOT

Montreal

When a book reaches its eleventh edition one may begin to speculate as to how many more there will be before its life is finished. In the case of Osler's textbook, however, one can hardly think of its ceasing to be. It is not that there are no others as good, as well written, as clear and as orderly; it is that there are no others which are quite the same. Even to a textbook, Osler was able to impart something of his freshness, his directness, and his grasp of the essential, all the things which together made up his unusual personality.

The full series of all these editions is in the Osler Library. His copy of the first edition has many notes and insertions. Amongst the latter is the prospectus of the book, on which he has written "This, thank the Lord, I did not write."

*The Principles and Practice of Medicine. Originally written by the Late Sir William Osler, Bt., M.D., F.R.S., formerly Fellow of the Royal College of Physicians, London, etc. Eleventh edition revised by Thomas McCrae, M.D., Fellow of the Royal College of Physicians, etc., 1,237 pages, illustrated. Price, \$8.50. New York and London, D. Appleton & Co., 1930.

On the title-page is his own entirely characteristic inscription: "PRIVATE COPY. May all the curses of the good Bishop Ernulphus light on the borrower-and-not-returner or upon the stealer of this book."

Then there is his account of how the book came to be written:

"On several occasions, in Philadelphia, I was asked by Lea Bros. to prepare a work on Diagnosis and had half promised one; indeed I had prepared a couple of chapters, but continually procrastinated on the plea that up to the 40th year a man was fit for better things than text-books. Time went on and as I crossed this date I began to feel that the energy and persistence necessary for the task were lacking. In Sept. 1890 I returned from a four months' trip in Europe, shook myself and towards the end of the month began a work on Practice. I had nearly finished the chapter on Typhoid Fever, when Dr. Granger, Messrs. Appleton's agent, came from N.Y. to ask me to prepare a Text-book on Medicine. We haggled for a few weeks about terms and finally, selling my brains to the Devil, I signed the contract. My intention had been to publish the work myself and have Lippincott or Blakiston (both of whom offered) handle the book, but the bait of a guaranteed circulation of 10,000 copies

in two years and fifteen hundred dollars on the date of publication was too glittering, and I was hooked."

The hooking was not such a bad business after all, since well over a quarter of a million copies have been sold up to the present.

His routine of work follows:

"Three mornings of each week I stayed at home and dictated from 8 a.m. till 1 p.m. On the alternate days I dictated after the morning hospital visit, beginning about 11.30. The spare hours of the afternoons were devoted to correction and reference work. . . . After 5 p.m. I saw any outside cases; dined at the Club about 6.30, loafed until 9.30, bed at 10, up at 7 a.m."

The heavy part of the work was done in the summer months, and the picture reproduced in Dr. Maude Abbott's Memorial Volume* shows him at his desk in his shirtsleeves, which, as Dr. Lafleur remarks,† will be understood by anyone who has spent a summer in Baltimore. Apparently the most troublesome part to him (as it probably is to most people) was the finishing of the book. "In January I made out the index, and in the entire work nothing so wearied me as the verifying of every reference. Without the help of Lafleur and Thayer who took the work off my hands I never could have finished in so short a time."

In spite of the heat he concludes:

"During the writing of the work I lost only one afternoon through transient indisposition and never a night's rest. Between September 1890 and January 1892 I gained nearly 8 lbs. in weight."

Among the miscellaneous bits which are inserted into this copy of his, are some clever skits which appeared in various numbers of the St. Thomas and Guy's Hospital Gazettes. Amongst these is the famous list of examination questions, which were made up on the 4th edition of the textbook. Some of these are as follows:

"What is 'one of the saddest chapters in the history of human deception?'"

Give Osler's quotations from the following authors:—John Bunyan, Byron, John Cheyne, George Cheyne, Montaigne. Explain the context where necessary.

What is O. Rosenbach's dictum on the custom of wearing stays?

What cases drift to 'museums and side-shows?'"

Quote Hunter's famous advice to Jenner.

What interest attaches to:—(a) the Pullman car conductor from Chicago? (b) The Appleton-Swain family? (c) Yellow cakes at Philadelphia? (d) Renforth the Oarsman? (e) Shattock's patient.

Who had a translucent head? What was the pathology of the condition?

* p. 270.

† *Ibid.*

On what occasion was a surgeon entrapped by a neurotic physician.

What internal evidence is there:—(a) That Osler has had an unhappy experience with cheap bicycles? (b) That he is interested in the history of Napoleon Bonaparte?"

On the question about the bicycle Sir William at a medical society meeting expressed the opinion that it had no answer, and that it was inserted only for the purpose of still further taxing the ingenuity of the reader. But it was pointed out that the explanation is to be found at page 771 of his fourth edition.

Another cutting is entitled "Tales from Osler," and it will take a more than usually well read student of Osler to give the context of each of the allusions. It is constructed in the form of the well-known parlour game of "Consequences", and runs as follows:

"The notorious Duchess of Cleveland met—my good friend Evans in a farmhouse so constructed as to shut out the sunlight and fresh air, and the vestibule was thoroughly screened. The average temperature for sixty-three days was about 76 F.

She had—a sharp nose, hollow eyes, collapsed temples; the ears contracted, cold and their lobes turned out; the skin about the forehead being rough, distended and parched; the colour of the whole face being brown, black, livid or lead coloured.

He was—ruddy in countenance, but especially the cheeks; the white of the eyes very bright and fatty; the point of the nose flat; the veins in the temples and neck distended.

She wore—a ricketty rosary.

He wore—a light flannel cape about the shoulders.

He said to her: 'persons over 40 eat too much.'

She said to him: 'deception may be practised.'

He said: 'Das Blut ist ein ganz besonderer Saft.'

She retorted: 'Shut your mouth!—and save your life.'

He gave her a good big bottle of paregoric.

She gave him—three sardines a l'huile.

The Consequence was—she shocked her mother and friends by constantly using the word damn.

And the world said: The Governor of the State of San Francisco showed an amazing stupidity, shared by not a few physicians who should have known better."

There is finally a poem (?), from which the following verses are extracted:

"Some people are keen upon Taylor
When studying medicine's wiles;
While others will steal a few moments with Wheeler
Both excellent books in their styles.
But give me the textbook of Osler,
(Or don't, for I've bought it by now)
And set *con amore* the laurel of glory
On William of Baltimore's brow.

It is not so much that it's breezy,
 Although 'tis undoubtedly that;
 I am not eulogistic because each statistic
 Comes out so impressively pat.
 It's all for the sake of the stories,
 He tells with a vigour so rare;
 No poisonous bloater has dogged Minnesota,
 But goes to posterity there."

At first the book was not copyrighted in Great Britain, and in 1901 a bookseller in Edinburgh published an unauthorized reprint of the fourth edition. Osler then issued a fifth edition which he copyrighted in Great Britain, but he

thought it necessary to explain why another edition was appearing so soon (it was only one year after the fourth). "I regret," he says, "the mistake that has disturbed the normal process of triennial parturition, but the circumstances justify what Rabelais calls 'The pretty perquisite of a superfœtation'."

Since then the progeny have been appearing at more normal intervals, and thanks to Dr. Thomas McCrae, the later members bear the burden of increasing knowledge with much of the vigour and spirit with which the work was endowed by Osler.

Association Notes

THE WINNIPEG MEETING. CANADIAN MEDICAL ASSOCIATION

Owing to the fact that this year the two affiliated medical Associations, British and Canadian, were fusing for the purposes of scientific discussion, the latter Association met in Winnipeg, through its Council, only for the transaction of necessary business. The sessions of Council lasted from August 22nd to August 25th. Many important topics were discussed and various reports of committees were received and adopted. It was learned with satisfaction that the Osler Committee had collected rather more than \$5,000.00, the amount necessary for the establishment of the Osler Lectureships. Perhaps the most exhaustive discussion centred about the question of one portal for medical registration. The finances of the Association proved to be in a highly satisfactory condition.

The following officers were elected:—

President—Dr. W. Harvey Smith, Winnipeg.

President-elect—Dr. A. F. Munro, Vancouver.

Honorary Treasurer—Dr. Frank S. Patch, Montreal.

General Secretary—Dr. T. C. Routley, Toronto.

Associate Secretaries—Drs. G. Harvey Agnew, Toronto, and A. Grant Fleming, Montreal.

Chairman of Council—Dr. A. T. Bazin, Montreal.

Executive Committee—Drs. W. Harvey Smith, A. F. Munro, F. S. Patch, T. C. Routley, A. T. Bazin and the following members at large: Dr. T. Glen Hamilton, Winnipeg; Dr. A. Primrose, Toronto; Dr. E. I. Myers, Saskatoon; Dr. J. G. FitzGerald, Toronto; Dr. Léon Gérin-Lajoie, Montreal; Dr. J. S. McEachern, Calgary; Dr. J. C. Meakins, Montreal; Dr. Geo. S. Young, Toronto; Dr. L. J. Austin, Kingston; Dr. C. J. Veniot, Bathurst, N.B.

Canadian Medical Association Journal:—

Editor Emeritus—Dr. A. D. Blackader.

Editor—Dr. A. G. Nicholls.

Assistant Editor—Dr. H. E. MacDermot.

Full details of the proceedings of Council will

be found in the supplement which appears in this issue.

The Council was graciously entertained to luncheon by the President-elect, Dr. W. Harvey Smith and to dinner by the Manitoba Medical Association.

BRITISH AND CANADIAN MEDICAL ASSOCIATIONS

The advance guard of the British Medical Association reached Quebec on the *S.S. Duchess of Bedford* on August 15th, being personally welcomed farther down the St. Lawrence by Dr. Bazin, President of the Canadian Medical Association and a special reception Committee. Owing to the inclemency of the weather, part of the entertainment provided at Quebec, notably the garden party at Spencerwood, the residence of the Lieutenant-Governor, had to be omitted. However, the party was entertained at dinner by the City of Quebec and some time was permitted for a visit to the hospitals. The steamer was delayed somewhat to enable the visitors to see the river by daylight. The party reached Montreal on Saturday, the sixteenth, where they remained until Monday, receiving the hospitality of the City of Montreal, the French-speaking medical profession, and numerous private entertainers. They then left for Toronto, where they were similarly received with acclamation. Some of the visitors diverged to visit Kenora, Minaki, and Nette, Manitoba. Other contingents followed the week later. All converged on Winnipeg, the majority reaching that city on the evening of Monday, August 25th.

The headquarters of the Association was the Winter Club, a charming building, which if possibly a little too small to accommodate such a large gathering, yet answered its purpose well and provided a pleasant rendezvous. The various sections met in the Winter Club, the University buildings, the Law Courts, the Legis-

lative Building, and in certain churches and church halls.

The proceedings began on Tuesday, the twenty-sixth of August, when the adjourned general meeting was held. This function was conducted with that smoothness, efficiency, and dignity that always has characterized such meetings of the British Medical Association. The picture presented was an attractive one, many of the delegates being in academic dress, and the platform graced with the presence of high officials of the two Associations.

The members of the Associations were welcomed officially by the Hon. John Bracken, B.S.A., LL.D., Premier of Manitoba, and Lt.-Col. Ralph H. Webb, D.S.O., M.C., in graceful words, and the Mayor presented the British Medical Association with a handsomely wrought flag of Winnipeg, which is destined to take its place in the Great Hall of the Association in London beside those of the other cities of the Empire where meetings have been held.

A pleasing formality was when the retiring President, Prof. A. H. Burgess, of Manchester, transferred his chain of office to the incoming President, Dr. W. Harvey Smith. In addressing Dr. Smith he said—"Your colleagues have decided that you above all others are the proper person to be the titular head of this association during the next twelve months. If it brings you a tithe of the pleasure, happiness, and good companionship that it has brought to me, then you will consider yourself, as I have considered myself, among the most fortunate of men."

Sir Ewen Maclean, of Cardiff, President in 1928-29 then invested Professor Burgess with the Past-President's Badge. The latter, in turn, to designate the President's lady, presented to the Association in a few graceful words a handsome badge, consisting of an artistic collar and pendant with the staff of Æsculapius entwined with snakes, and then proceeded to invest Mrs. Harvey Smith with the badge.

It was then reported that Dr. W. G. Wiloughby, of Eastbourne, had been elected President for the year 1931-32, and he was invested by the President with his badge of office.

Other notable features were the election of Honorary Members in the persons of the Most Reverend S. P. Matheson, Archbishop of Rupert's Land and Metropolitan of All Canada, and Mr. T. B. Macaulay, LL.D., President of the Sun Life Assurance Company, Montreal. Two new Vice-Presidents, Dr. A. D. Blackader, of Montreal, and Sir Ewen Maclean, of Cardiff, were officially received.

Delegates from the Overseas Dominions and Colonies, and from the United States were then introduced.

Formal announcement was made of the award of the Sir Charles Hastings' Clinical Prize to Dr. William Henry Bradley, of Stratton-on-the-Fosse, for his study on "Naso-Pharyngeal Epidemics in Public Schools;" of the Katherine Bishop Harman Prize to Dr. Richard Robins

Armstrong, London, and Dr. Harold Burt-White, London, for their joint essay on "The Problems of Puerperal Sepsis;" and of the Dawson Williams Memorial Fund Prize to Dr. Frederick J. Poynton, London, for his work on behalf of rheumatic children.

The President, Dr. W. Harvey Smith, then delivered his presidential address, which appeared in our *Journal* in last month's issue. A vote of thanks to the president was moved by Dr. C. O. Hawthorne, Chairman of the Representative Body (B.M.A.) and seconded by Mr. H. B. Shaw.

The scientific program began next day—Tuesday, the twenty-sixth.

Clinics were held in the mornings by Mr. Hugh Cairns, F.R.C.S. on "Surgical Cases;" Dr. John Parkinson, F.R.C.P., on "Coronary Thrombosis;" Dr. George Riddoch, F.R.C.P., on "Some Cases of Organic Nervous Diseases;" and Dr. Donald Paterson, F.R.C.P., on "Coeliac Disease and Pyloric Stenosis."

Afternoon addresses were given by Prof. W. E. Dixon, F.R.S., on "Drug Addiction;" by Sir William I. de C. Wheeler, F.R.C.S.I., on "The Significance of Surgical Recoil in Visceral Decompression;" by Dr. Hector Cameron, F.R.C.P., on "Some Functional Nervous Disorders in Childhood;" and by Sir E. Farquhar Buzzard, M.D., F.R.C.P., on "Rest, Work, and Play, in Health and Disease."

Evening lectures were delivered by Dr. Robert Hutchison, F.R.C.P., on "The Pursuit of Health;" Morris Fishbein, M.D., on "Food Fads and Follies;" and Sir James Barrett, F.R.C.S., on the "Bush Nursing System."

The Listerian Oration was delivered on Friday evening, the 29th., by Lord Moynihan to a crowded hall, when Dr. John Stewart, of Halifax, one of Lord Lister's house surgeons, occupied the chair and introduced the speaker feelingly and in a felicitous way.

The sectional programs were not overburdened with topics. One or two subjects were chosen each day, in the different departments, and they were thoroughly well discussed. In this way it was possible to cover the program without undue haste. This was a commendable feature. Most of the papers will appear from time to time in the *Journal*.

THE SCIENTIFIC EXHIBITS

The work of the committee on scientific exhibits, of which Prof. J. C. B. Grant was chairman and Dr. Daniel Nicholson was secretary, deserves great commendation. Through their untiring efforts much material was gathered together from the medical centres of Canada, from Great Britain, and the United States. Situated conveniently to the large auditorium, the collection was easy of access, well documented, and of exceptional interest. It is impossible here to deal fully with this subject, but the outstanding features may well be noted.

In the surgical section the following items attracted most attention. A demonstration

showing the effects of sympathectomy in vascular diseases was exhibited by Dr. A. W. Adson, Mayo Clinic, Rochester. One show case illustrated the clinical and pathological features of Raynaud's disease and their surgical treatment by sympathectomy. Wax models of the hands and feet were shown, demonstrating the cyanotic appearance before operation and normal colour after operation. Charts were shown illustrating the operation used for excision of the lumbar sympathetic ganglia in Raynaud's disease of the lower extremities; also charts showing the increase in temperature following operation. Pictures taken with a capillary microscope showed the changes in the capillaries in the nail fold before and after surgical treatment. This mode of surgical treatment is also quite useful in thrombo-angiitis obliterans. Coloured microphotographs were shown illustrating the cross section of veins and arteries in this disease. Wax models of the hands and feet showing typical lesions of thrombo-angiitis obliterans were part of the exhibit, also an analysis of symptoms such as claudication, non-healing ulcers, sudden arterial occlusion, superficial phlebitis, oedema, and vasomotor disturbances. Of these claudication was the most important. The duration averaged 45 months. Sympathectomy is of value in this disease except where extensive gangrene has occurred.

Sciatica was the subject of another interesting demonstration. This disease, which is moderately common and produces a severe prolonged pain with marked disability, lent itself to an interesting exhibit, which illustrated very definitely how sciatica could be classified from the standpoint of infectious origin, neuritis and arthritis. Charts were shown illustrating typical cases and x-ray pictures illustrating the type of bone lesion frequently found. Gross dissections of the lumbar spines and pelvis showed the outlet of the nerves and the usual osteo-arthritis changes occurring therein. This exhibit was prepared by Dr. A. P. McKinnon, Surgeon to the Orthopaedic Section, St. Boniface Hospital, Winnipeg.

The treatment of the varicose ulcer was the subject of an interesting exhibit by Mr. A. Dickson Wright, of St. Mary's Hospital, London. This exhibit consisted of two plaster casts illustrating a moderately advanced varicose ulcer before and after surgical treatment, also bottled specimens showing actual lesions both in the tissue and in the bone. There were many photographs showing the various stages of healing, and Mr. Wright gave a number of cinematographic demonstrations on his method of treatment which consisted mainly in compression bandages applied to expel the oedema. Small skin grafts were used when necessary to produce rapid healing of the ulcer and bandages were applied weekly to support the tissue. Sodium morrhuate injections were used for varicosities.

A unique collection of calculi from the urinary bladder was shown by Dr. E. J. Boardman, of Winnipeg; also, transverse sections of the calculi

showed their structure in a very striking manner. Specimens of stone from various sources were similarly prepared. The exhibit consisted of stalactites from caves, deposits from around water pipes, stones passed at stool, and calculi from chronically inflamed joints.

A large chart showing the age incidence of carcinoma in surgical specimens of cancer from the Pathological Institute of McGill University was shown. For this study 1,756 surgical specimens were examined and the percentage incidence was shown of each organ including the breast, cervix, and other pelvic organs, lip, tongue, mouth, gastro-intestinal tract and skin. Of the total, the greatest incidence occurred at from 50 to 60 years of age, there being a definite increase from 35 on and a decrease from 60 to 75 years of age.

The facial surgery exhibit from the Canadian Army Medical Museum was an interesting and extensive one. It showed the various stages in repairing the damaged parts by flesh grafts. Also illustrations showing the most suitable means of blood transfusion in the forward area were shown. As fractures and injury to bone played a large part in war surgery a series collected by Major Rhea was shown. These consisted of compound comminuted fractures, some showing the loss of substance caused by the bullet or shrapnel.

An exhibit of surgical anatomy was shown from the Dept. of Anatomy, University of Manitoba. The synovial folds about joints in health were very nicely shown and demonstrated the extraordinary but normal extensions of these folds in the joints of the limbs. They are normal and not pathological, as is evident by the fact that they may be found in the embryo at birth and at the age of seven, as well as in the adult. The specimens shown were taken from the elbow, wrist and ankle joints.

Much interest has been taken recently in diverticula of the intestinal tract and a series of specimens showing duodenal diverticula was shown. These consisted of dissections showing the exact location and size of the various diverticula, accompanied by line drawings and legends.

Many of the exhibits on pathology were also of interest from a surgical standpoint. For instance, a series of brain tumours was shown by the Department of Pathology, University of Manitoba. These were accompanied by clinical outlines and microphotographs from which they could be classified to form a prognosis and guide for treatment.

The Medical Art exhibit was of considerable interest, not only in surgery but in all fields of medicine. The Department of Neuro-surgery was represented by specimens drawn by Miss Maria Wishart, of Toronto. These illustrated not only the primary pathological lesion but also the various steps in surgical treatment and after results. From McGill University there were a large series of drawings illustrating gynaecological and urological diseases with their

appropriate treatment. These were drawn by Miss Harriet Blackstock of McGill University.

From the medical standpoint the art exhibits from McGill University and Toronto University provided unusual interest, especially the wax casts illustrating various forms of skin disease and drawings in which a typical clinical appearance enables one to make a diagnosis, as in pellagra, acute obstructive hydrocephalus, etc. Here Miss Hortense Douglas, of the Montreal General Hospital, was represented.

In cardiology, electrocardiographs of unusual cardiac conditions were shown by Dr. Burrige of the Winnipeg General Hospital. Studies showing the relation of goitre to cardiac disease were shown by Drs. D. McEachern and E. C. Andrus, of the Johns Hopkins Hospital, Baltimore; and a series of charts illustrating the use of the polygraph were shown by Sir Kenneth Goadby who also gave a demonstration of the clinical value of this instrument.

Demonstrations of the cell sedimentation test, a simple method of blood matching for transfusion, cell-diameter measurement by the use of an ordinary Kodak camera and the value of observation on the rate of clot contraction, were arranged by Dr. Daniel Nicholson of the University of Manitoba. These were explained by demonstrators, Mr. Cameron, Mr. Williams, Mr. Donaldson, Mr. Duncan. This interested chiefly the men practising in the country where one has to do his own laboratory work.

A series of casts, the handiwork of Dr. Gregor McGregor, were shown by the Department of Oto-Laryngology, University of Toronto. These were made from cadaver specimens and dissections. They were accompanied by descriptions and demonstrated points of surgical interest in disease of the ear, nose and throat.

A series of foreign bodies removed from the air passages and the oesophagus were exhibited by Dr. George Fletcher, of the Winnipeg General Hospital. This included, coins, fruit stones, pins, pieces of dental plate, buttons, etc.

Tumours of the larynx and pharynx were demonstrated by gross bottled specimens and microphotographic sections loaned by Mr. E. D. Davis, Charing Cross Hospital, London. These were also used for demonstration purposes in his address to the clinical section of Oto-Laryngology.

Again, the Medical Art Department, McGill University showed a series of diseased conditions of the external and internal eye.

A series of coloured illustrations showing traumatic lesions of the eye, collected by Col. S. H. McKee, of the Westcliff Canadian Eye and Ear Hospital, was loaned by the Canadian Army Museum.

Lantern slides showing the various types of squints before and after operation was shown by Dr. C. M. Clare, Children's Hospital, Winnipeg.

A large collection of brain tumours with microphotographs was loaned by the Depart-

ment of Pathology, University of Manitoba. This was the basis of Dr. Boyd's paper on brain tumours in the Section of Pathology. A collection of renal and other pathological specimens was lent by St. Boniface Hospital, Winnipeg.

From McGill Medical Museum a collection of specimens illustrating various cardiac anomalies, prepared by Dr. Maude Abbott, was shown. Dr. Oertel showed microphotographs of his studies on the innervation of tumours.

Prof. James Miller, of Queen's University, showed a series of specimens, including interesting studies on syphilitic glomerulo-nephritis. These were accompanied by microphotographs.

The origin and constitution of carcinoids and pigmented naevi with their nervous elements were very excellently demonstrated by a series of beautiful autochromes lent by Dr. L. C. Simard, Université de Montréal. Dr. Simard read a paper at the Pathological Section on the origin and constitution of these tumours.

There was a large exhibit of a high order in radiology. Specimens were lent from the principal hospitals throughout Canada and the films were all reduced to the 8 x 11 size and arranged in system from an anatomical standpoint. The use of radium and the x-ray was illustrated by electrocardiac studies of patients treated for cancers at the Radium Institute, Montreal.

Radiation dosage and a standardized method of measuring tissue dosage in intra-oral carcinoma were elucidated by a large display of charts loaned by Drs. Quick and Martin of the Memorial Hospital for Malignant Disease, New York.

An exhibit on melanosis in the bowel was shown by a series of tissue sections lent by Prof. M. J. Stewart, School of Medicine, Leeds. These studies were the basis for his paper on "Melanin" at the Pathological section.

The Laboratories of the University of Toronto supplied a large exhibit of unusual scientific interest from the public health standpoint. The preparation of diphtheria toxoid, (anatoxine-Ramon) was shown in detail. The identification of small-pox virus by the reaction in the skin of the rabbit was also shown. This is a convenient and successful means of standardizing the virus. Another exhibit showed the preparation of concentrated scarlet fever toxin and its effect on animals. By this means it is hoped that a toxin may be standardized for distribution rather than that we should depend on reactions in human beings. The result of research in tuberculosis was shown by the reaction produced in skin grafts from tuberculous guinea pigs on to normal ones. Charts from the Department of Biometrics illustrated the diabetic mortality in Ontario during the past 50 years and the diphtheria mortality in Ontario during the past 40 years. A motion picture film operated continuously showing the various phases of activity in the School of Hygiene and the Connaught Laboratories, Toronto.

Studies of *Bacillus Calmette-Guérin*, which had been carried out by the Alberta Government

and a University Committee over the past five years, were summarized and displayed on chart form. From this research on calves it appears that the BCG vaccine produces resistance to tuberculosis in bovines and that the vaccine is not virulent for bovines. Prof. A. C. Rankin, of the Department of Pathology, University of Alberta, lent a small exhibit to show the common wood tick which causes tick paralysis and may be a cause of spotted fever in human beings as well as in animals.

An exhibit of grain rusts, with gross and microscopic preparations, was lent by Dr. Fred T. Cadham, of the University of Manitoba. This is a fungus which causes an extensive infection of the grain crops in western Canada. The fungus may be a cause of bronchial asthma in the same manner as plant pollens.

Charts showing the incidence of typhoid fever before and after proper sanitation had been adopted in Winnipeg were displayed, which illustrated how this disease decreased in exact proportion as the number of dry closets were closed up and proper sanitation adopted. Charts showing the decrease in infant mortality in recent years and the lowering incidence of diphtheria following the use of toxoid in the schools were also exhibited.

An exhibit showing the life cycle and interesting factors about the mosquito, together with the successful method employed in the Winnipeg Anti-Mosquito Campaign, was lent by Dr. H. M. Speechley. A glass tank of water was shown containing living larval mosquitos.

The life cycle of the broad (fish) tape worm was the subject of exhibits lent by Drs. Essex and Magath, of the Mayo Foundation, and also by Dr. Daniel Nicholson of the University of Manitoba.

A series of charts describing the 1928 epidemic of poliomyelitis in Winnipeg, from studies prepared by the Medical Research Committee of the University of Manitoba, was lent by Dr. J. M. McEachern.

A series of plans of hospitals in Canada was lent by B. Evan Parry, supervising architect, Department of Pensions and National Health, Ottawa. These showed the cost and bed capacity of the various hospitals, and form a valuable guide to cities and municipalities contemplating construction of hospitals.

The attendance at the scientific exhibit was good. The booths were quite crowded on the first day and over a period of six hours on the third day (Thursday) 769 entered by actual count. There were actually more than this, as the attendant could not count all that entered in the large groups.

Close by was a remarkable exhibit arranged by Dr. T. Glen Hamilton and his associates relating to physical research. Photographs, ordinary and stereoscopic, of teleplasmic manifestations, table levitation, and the like aroused much interest. Whatever one may think of the matter there was much here to stimulate thought and demand enquiry.

THE HOBBIES

A most delightful collection of objets d'art, etchings, paintings, wood-carvings, sculpture, coins, postage stamps, photographs, and curios of many kinds had been arranged by Drs. H. M. Speechley and J. C. B. Grant, to whom the Association is much indebted. Perhaps never before has so much material of varied character been collected for exhibition at our meetings. Not only did East meet West here, but much was accumulated to link us with the historic, not to say, the prehistoric past. It is indeed gratifying to learn of the great amount of genuine artistic talent which finds expression in the handiwork of our medical brethren. To relax in season and to utilize spare moments in the production or collection of beautiful things is no mean achievement. The hope of the committee, that the Hobbies Exhibit might be the means of setting up contacts, not only between the exhibitors but between some of the visitors from distant parts of our Empire, is altogether laudable and may well be realized.

The exhibit was arranged in certain of the racquet courts at the Winter Club, and proved a decided drawing card. The first object that attracted attention on entering was a large oil painting of the President, Dr. W. Harvey Smith, executed with great fidelity by Dr. Egerton Pope. The wide range of hobbies covered can be inferred from the following list:

PAINTINGS

In Oils:

Yellow Knife River, Great Slave Lake
St. Fidèle, Quebec
Winter on a Quebec Farm
Fort McMurray, N. Alberta
Fort Resolution, Great Slave Lake

—Dr. F. G. Banting, Toronto, Ont.

Fraser Canyon, B.C.
Perce Rock, Gaspé, Que.
Mitt Ridges, Magnatawan District, N. Ontario
Autumn in the Deer Country, N. Ontario

—Dr. G. Harvey Agnew, Toronto, Ont.

Yellow Knife River, Great Slave Lake
Fort Resolution, Great Slave Lake

—Dr. J. R. Byers, Montreal, Que.

Le Pêcheur copié de Marantonie
Scène d'automne

—Dr. A. A. Foucher, Montreal, Que.

A Portrait —Dr. Egerton Pope, Edmonton, Alta.
Mushkosh River, Muskoka
Sheepshead Bay, Brooklyn

—Dr. J. K. Ross, Toronto, Ont.

..... —Dr. Roy J. Spence, Toronto, Ont.

Dawn, Lake Simcoe
An Ontario Rye Field
Autumn Foliage
Across the Valley

—Dr. E. M. Walker, Toronto, Ont.

Return from Reconnaissance, Loos Salient, 1917

—Dr. Fraser B. Gurd, Montreal, Que.

In Water Colours

A Mountain Scene

—Dr. Percy G. Bell, Winnipeg, Man.

Three Landscapes

—Dr. Egerton Pope, Edmonton, Alta.

Two Views of Ninette

—Dr. D. A. Stewart, Ninette, Man.

Ravello

On Kingston Harbour

—Dr. F. D. McKenty, Winnipeg, Man.

Sketches in Black and White

—Dr. A. Blondal, Winnipeg, Man.

Archies in Action

A Farmyard in Flanders

Evening in Flanders

—Dr. Fraser B. Gurd, Montreal, Que.

18 Paintings of Drug Plants used by Amerindians

—Loaned by Ernest Endres, Esq., Westbrook, Conn., U.S.A.

An Aquatint—Edinburgh Castle

Parliament Buildings, London, Eng.

Light That Never Failed

Etching:

Doorway, St. Peter's Cathedral, London, Ont.

—Dr. J. I. Le Touzel, London, Ont.

LINO CUTS

Four-Colour Blocks

—Dr. Fred A. Bowman, Hamilton, Ont.

SCULPTURE AND MODELLING

Seven Bronzes and One Plaster

—Dr. R. Tait MacKenzie, Philadelphia

The Philosopher

—Dr. B. L. Guyatt, Toronto, Ont.

Carved Figure in Maple Wood: "The Habitant"

—Dr. A. H. Pirie, Montreal, Que.

WOODWORK

A Guitar made from Trench Timber

—Dr. J. Pullar, Winnipeg, Man.

Carved Wood Animals

—Dr. G. H. Lansdowne, Winnipeg, Man.

PHILATELY

Stamps of Malta and Gibraltar

—Dr. L. J. Austin, Kingston, Ont.

Collection

—Dr. Joseph Gilchrist, Toronto, Ont.

PHOTOGRAPHS

Purple Martins

—Dr. A. M. Davidson, Winnipeg, Man.

Four Landscapes in England and Canada

—Dr. C. A. Baragar, Brandon, Man.

Legislative Building, Winnipeg

Interior of Legislative Building

The Campus, Queen's University

The Terrace

Autumn

Winter Blossoms

The Log Cabin

The Woods in Winter

Lake of the Forest

A Mountain Torrent

—Dr. Wm. Boyd, Winnipeg, Man.

John Brown's Grave, Placid Lake

—Dr. T. Glen Hamilton, Winnipeg, Man.

and other prints

MUSICAL MANUSCRIPTS

Original Specimens of Vocal and Instrumental Music for Orchestra and Choir

—Dr. E. Fforde McLoghlin, Hamilton, Ont.

ENTOMOLOGY

The Syrphidae of North America

—Dr. A. J. Hunter, Teulon, Man.

NUMISMATOLOGY

Canadian Coins and Tokens

—Dr. A. J. Hunter, Teulon, Man.

HORTICULTURE

Flowers

—Dr. Percy Bell, Winnipeg, Man.

Vegetables

—Dr. G. W. Knipe, St. James, Man.

NATURAL HISTORY

(Organized by Dr. H. M. Speechly, Winnipeg)

Ornithology:

The Humming-Bird

The Nest of the Canada Jay

—Mr. A. G. Lawrence, Winnipeg, Man.

Geology:

Petrified Wood —Dr. Hans Herschmann, Winnipeg

Flint Implements of North America

—Mr. H. Rand, Winnipeg, Man.

REVOLVER TARGETS

Dr. Wm. Webster, Winnipeg, Man.

Dr. Dan. Nicholson, Winnipeg, Man.

CURIOS

Exhibited by Dr. Margaret Ellen Douglass, Winnipeg, Man.

Among the Canadian coins and tokens exhibited by Dr. A. J. Hunter, was a most interesting and valuable collection of the early coins, trade, and bank tokens issued in the early days by the various provinces. The natural history exhibit was particularly attractive. Among the many charming pieces exhibited by Dr. Margaret Douglass, of Winnipeg, was a splendid instrument cabinet presented by his pupils to the late Sir James Paget when on the attending staff of St. Bartholomew's Hospital.

THE COMMERCIAL EXHIBITS

The commercial exhibits occupied a large hall leading off the main entrance lounge of the Winter Club, and were so placed that all passing through to register or transact other business had to circulate among the booths. The exhibits were attractive and their arrangement reflected great credit on the chairman of the special committee, Dr. J. C. McMillan, the secretary, Dr. E. H. Alexander and their energetic assistants. Some sixty firms were represented, among them about five English concerns in addition to others represented by Canadian agents. Besides those featuring surgical instruments, drugs, apparatus, and books, other interests were displayed. The Victorian Order of Nurses had a booth; The T. Eaton Co. showed the furnishings of a hospital room, and the Hudson's Bay Company included an exhibit of furs. The Medical Audit Association and the Metropolitan Life Insurance Company were also represented. Much interest was manifested in this particular effort, which was very attractive.

REGISTRATION

Considering the long distance that our overseas visitors had to come, and the prevailing "hard times," the attendance must be regarded as very satisfactory. The number of medical men and women, medical students, university professors, and nurses was 1,183. Of these, 283 physicians came from overseas, 204 from the United States and 1,129 hailed from Canada. It is gratifying to learn that the Canadian Association was augmented to the extent of 298 new members. Adding to these figures those for the families of the members and the staff in charge of the commercial exhibits the total registration was 3,042. Winnipeg is to be congratulated on handling this large influx of population so efficiently and pleasantly.

THE SOCIAL SIDE

Not the least interesting of the features of this notable meeting were the many social events. The hospitality of the citizens of Winnipeg knew no bounds and was much appreciated.

The religious service, an almost century old feature of the British Medical Association, was held on the Tuesday afternoon. No church in Winnipeg could have held the throng, and so it was decided to hold the service on the steps of the impressive Legislative Building. The service symbolized the close relationship that has existed between religion and medicine almost from time immemorial. Starting from the Winter Club a great concourse of doctors, clad in academic robes of many colours, headed by the flag of Winnipeg and the processional staff of the British Medical Association, passed in procession through the streets to the cenotaph, where Dr. W. Harvey Smith deposited a wreath on behalf of the British Medical Association to the memory of the men who gave their lives in the Great War. A bugler then sounded the "Last Post."

The line of march was marked by boy scouts placed at intervals, each of whom held a blue standard on which were inscribed in letters of gold the names of the dead but not forgotten worthies of the medical profession.

A wonderful sight was presented from the steps of the Parliament buildings as the procession from the Cenotaph passed through the great semi-circle of nearly 10,000 people. The band of the "Princess Pats," under Capt. T. W. James, struck up a martial air as the double column of doctors broke into two ranks passing one each side of the Victoria memorial, and led by the new president and the old, Dr. W. Harvey Smith and Prof. Arthur H. Burgess, respectively.

Added glamour was given to the occasion by a detachment of Sea Cadets who stood at the slope with fixed bayonets and acted as a guard of honour. The pageantry of colour was accentuated when a score or more members of the Winnipeg Folk Arts Society, representing in their national dress, Denmark, Norway, Iceland, Poland, Hungary, Czecho-Slovakia and the

Ukraine, took their places close to the massed ranks of the gowned medicos.

The white uniforms of the nurses from all the Winnipeg hospitals, reinforced by the royal blue uniforms of the returned Military Nurses added to the picturesqueness of the scene.

The latter body, numbering 22 and wearing their war decorations and medals, were in the charge of Sister McGillvray. The civil hospitals represented were those of St. Boniface, Grace, General, Victoria and Misericordia. The Victorian Order of Nurses also was represented.

The Venerable Archbishop of Rupert's Land, who conducted the service, was accompanied by ministers of other religious denominations, and also representatives of the Salvation Army. The lesson was read by the President, Dr. W. Harvey Smith and hymns which are commonly favoured for this service were sung by the choir, accompanied by the great concourse of people. The instrumental music was furnished by the band of the Princess Patricia's Canadian Light Infantry. The chosen hymns were:—"O God Our Help in Ages Past," "Unto the Hills" and "For All the Saints," while the choir also rendered the Cherubic hymn of Gretchaninoff, and, unaccompanied, sang the 19th Psalm.

Prayers were read by the Archbishop, after which he delivered a short sermon, his text being taken from Colossians, chapter 4:—"Luke the beloved physician greets you." Pointing out that Christ healed the sick and really conducted a medical clinic, His Grace said that surely a Christian doctor in a Christian country could claim a beneficent succession from the great Galilean.

Paying a tribute to the advances made in medical knowledge and skill since the earliest times, His Grace, after referring to the great love and regard which in 1861 was felt in Winnipeg for Dr. John Burns, added:

"I ask you to keep your profession noble. While by research and discovery and by hard study you raise it high in usefulness to mankind, hold it up by your personal integrity, hold it up to the loftiest ideals and the final traditions that characterize not only a useful but a beloved physician."

After the benediction was pronounced the great gathering slowly separated.

In the evening the President and Mrs. Harvey Smith held a reception in the magnificent Legislative Building, which lent itself particularly well to scenic effects. As the many guests, clad in evening or academic dress, ascended the noble staircase, at the bottom of which are two enormous bronze buffalo, between lines of officers of the "Princess Pats" in brilliant uniforms, to greet their host and hostess, the picture was striking in the extreme. The building itself was impressive and formed an admirable background for the living actors.

The next notable event was an Afternoon Tea held at Tuxedo, just outside of Winnipeg. Here were pitched the tepees of some sixty Plain Cree

and other Indians, brought from Saskatchewan. The braves in their gala attire and wonderful feather head-dresses, and the squaws in brilliant and richly embroidered jackets and dresses presented a sight not soon to be forgotten. The gathering was held chiefly for the purpose of inducting Lord Dawson as a chief of the Plain Cree tribe, which was done by Chief Red Dog, who pronounced an oration (in Cree) which was much appreciated. Some war whoops and some strokes on a big drum concluded this part of the proceedings. The new Chief, who was clearly somewhat overcome by his new dignity and the novelty of the proceedings expressed his thanks in an appropriate speech and shook hands with the assembled Chiefs. A splendid buffalo head was then presented to the British Medical Association, when the new Premier of Canada, the Hon. R. B. Bennett spoke.

At a Special Convocation of the University of Manitoba, presided over by the Chancellor, the Most Reverend S. P. Matheson, Archbishop of Rupert's Land, held on August 28th, the following were granted the honorary degree of Doctor of Laws:—Sir James Barrett, Prof. Arthur H. Burgess, Sir Farquhar Buzzard, Dr. Alfred Cox, Lord Dawson, Dr. W. E. Dixon, Mr. N. Bishop Harman, Lord Moynihan, Dr. W. Prowse, Dr. W. Harvey Smith, Sir StClair Thomson.

On the evening of the same day fifteen hundred members, their wives, and friends sat down to dinner in the Hudson Bay Stores. Here again was a signal triumph. Professor W. Harvey Smith, M.A., M.D., LL.D., Winnipeg, the new President of the Association, presided. Hon. John Bracken, premier of Manitoba, was among the guests, as was also Alderman E. T. Leech, K.C., who attended in the absence of Mayor R. H. Webb.

Proposing the toast of "The Empire" in a notable speech, Lord Moynihan said that the 98th annual dinner of the association was a very great imperial gathering. There were present men who belonged to the realm of the politician, men who were of all shades of political opinion, men who belonged to his own profession, and, most notable of all, they had present a newly elected member of an ancient Indian tribe. This reference to the ceremony at which Lord Dawson of Penn was made a chief of the Cree tribe on Wednesday caused a great deal of laughter, which was renewed when Lord Moynihan alluded to the brilliant appearance of the tribesmen and suggested that they should no longer be known as "Plain Crees."

Speaking of the sessions of the convention, his lordship said the delegates were doing something more than contributing to their own profession or their own happiness. They were building a fragment of a mighty empire.

"We are meeting in Canada," said Lord Moynihan, "stories of the origin and progress, and the idea of the destiny of Canada make very high romance. It has been said that in the new age

the Westminster of the world will be at Ottawa. That may be true or it may not. It is perhaps only a figment of the imagination of some men, but as the poet said, 'Imagination is like Adam's dream; he awoke and found it true.' The heart of the empire would never be in Ottawa. It would never be in Westminster. It would never be in any Australian centre, nor in Capetown. The heart of the empire is in the hearts of men. It was in the hearts of men, and not in the minds of men, that the idea of the British Empire had come to light. It was in the hearts of men that that idea would grow and grow until it involved the whole world in its embrace, because it is based on the binding power of justice, mercy and loving kindness.

"Is this a dream or is it, as some would say, madness? You may recall the circumstances under which General Wolfe was appointed by the King to lead the British army in Quebec. Representations were made to the King that he was too young, and that he had the misfortune, as some others have of being an Irishman, that he was incompetent and inexperienced. None of those objections weighed with the King, and finally it was reported to His Majesty that Wolfe was mad. The reply of the King was, 'If Wolfe is mad, then I wish to God he would bite my other generals.' If this idea be madness, then I hope it will make its impression on the world in the same way.

"We have inherited an empire. What are we going to do to hold it? Many suggestions have been made. At the moment the great subject of discussion is, what commercial bonds can be created between the various parts of the Empire? The question is being asked whether we in England are wisely clinging to free trade as the only rock that can save us in a time of peril, or whether we are foolish in clinging to a tradition that is a delusion.

"Whether we are worshipping an effete tradition or otherwise, the next few years will decide. We cannot be kept together as an empire by any power of law. The Roman empire was held together by law alone, and it is nothing but a very honoured memory. Israel tried to keep its empire together by moral law, and the empire of Israel has gone.

"What is going to hold our Empire together? Let me make a suggestion—that it may be in the pursuit of science together. Science is the only quest for truth that has no partizan bias. If that is so, we as a department of science, have a right to ask what we are doing to hold the Empire together, as a department of medicine in the great temple of science?

"Years ago, the answer would be that England was doing nothing, and I would add that England did not even realize that it was necessary for her to do anything. But she awoke at last from her very long and very profound slumber. When I was appointed a little more than four years ago, president of the Royal College of Surgeons of England, I urged that there were certain things

that should be done. I said I would like to see a post-graduate hospital, which would be the best in the world. In London there is everything, almost endless material, men at least as good as any in the world.

"There was only one thing lacking and that was the desire to establish such a hospital in which there would be room for post-graduate men from all parts of the Empire. As a result the government provided £250,000 for the establishment in London of a post-graduate school. In addition, we desired a hostel so that students from the various parts of the Empire could be properly provided for. As a result £60,000 had been voted for a Dominion hostel in London close to the London university.

"Something has been done by our own college in London. We realize that we wanted more of the men of Canada and other parts of the Empire to take fellowship in our college. Last year we sent our own men to conduct examinations in Toronto. Next year examinations will be conducted in Montreal. We are hoping that you will ask us to come again. We have already arranged to go to Australia.

"No empire has ever yet been founded, nor will any empire ever endure, that is founded only upon material things. The only empire that can ever endure is one that is founded upon love and honour, truth and charity, and a sense of duty."

In responding, Dr. W. W. White, mayor of St. John, spoke of the benefits of such a convention as that of the British Medical Association in promoting the spirit of friendliness in all parts of the British Commonwealth. He traced the history of the Empire, and emphasized the point that it would be an everlasting inspiration.

Proposing the toast of "The British Medical Association," Dr. W. W. Chipman, of McGill University, in a brilliant speech, extended a cordial welcome to the visiting delegates and said the association of Canadian physicians with them had been of the pleasantest and most helpful kind.

In responding, Dr. H. B. Brackenbury, chairman of the council of the British Medical Association, said the visiting delegates had been delighted with the wonderful hospitality extended, and their recollections of the convention proceedings would be of the happiest kind.

There was a happy variation in the program when Dr. Adamson, General Local Secretary of the association, presented Dr. Alfred Cox, Secretary of the British Medical Association, with a bronze buffalo, beautifully mounted on stone, as a souvenir of the convention, and in recognition of the splendid manner in which he had made the arrangements for the gathering. The handsome gift was presented in the name of the committee in charge of the local arrangements.

Speaking in humorous vein, and keeping the guests laughing uproariously most of the time, Sir StClair Thomson proposed "The Guests," a toast that was acknowledged by Dr. William Gerry Morgan, president of the American Medical Association, who enthusiastically acknowledged his association's debt of gratitude to the British organization.

"The Ladies" was proposed by Professor A. H. Burgess, Manchester, in a witty speech and the toast was acknowledged very gracefully by Mrs. W. Harvey Smith, Winnipeg.

The social events were brought to a splendid close with an Afternoon Tea, held at Lower Fort Garry, about twenty miles north of Winnipeg, the last remaining of the stone forts of the Hudson Bay Company. Here was originally the seat of government, and here history was made. A striking feature of the occasion was the singing and dancing of a company of Ukrainians, who clad in their bright and picturesque native costumes sang some of their somewhat plaintive songs, beginning with "O Canada" in their own language. Following these a Polish group gave an exhibition of dancing. Their services were recognized when Dr. W. Harvey Smith presented each team with a suitably engraved plaque to commemorate the occasion. A war canoe race, in which canoes were manned by women (so to speak) caused much excitement. "A delightful afternoon" was the verdict.

The meetings terminated on Friday, the twenty-ninth, when Lord Moynihan delivered his Listerian Oration, a worthy effort, in succession to Dr. John Stewart and Sir Charles Sherrington.

The Winnipeg Meeting will live long in memory for the excellence of its scientific pronouncements, for its generous hospitality and unique entertainment.

TRANSMISSION OF HÆMOPHILIA.—C. A. Mills reports a bleeder family. Two sisters, unaffected, had each two sons, all four boys being bad bleeders throughout life. The family tree of the descendants of only one of these four boys is available. This one married a woman who was in no way related to him and who had no known bleeding in her family. Throughout the subsequent history of the family there were no marriages with outsiders who were in any known way connected with the disease.

This family was the only one in that locality with hæmophilia. Yet among the thirty-one female and twenty-five male known descendants of this one hæmophilic man there were eight males with undoubted hæmophilia and three open to question. No females were affected, but transmission, except in the one instance, was always through them. In two instances the disease passed through two generations of females to appear in the males of the third generation.—*J. Am. M. Ass.* 94: 1571, May 17, 1930.

Hospital Service Department Notes

THE ROYAL COMMISSION ON PUBLIC WELFARE RECOMMENDS HOSPITAL CHANGES IN ONTARIO

The long awaited report of the Royal Commission on Public Welfare appointed by the Ontario Government has been given to the press and the recommendations contained therein are of considerable interest to hospitals and to those interested in social problems. At the time of going to press copies of the report were not available, but the following notes have been abstracted from the report furnished to the public press.

GENERAL HOSPITALS

The Commissioners are of the opinion that the general hospitals, except as regards pay patients, should be a complete charge upon public funds, either provincial or municipal. They recommend that legislation provide that the cost of non-pay patients in general hospitals be met fully by public money on the basis of one-quarter by the government and three-quarters by the municipalities from which the patients come.

It is further recommended that four types of hospital accommodation be provided,—

1. Public wards for non-pay patients only.
2. Semi-public wards for paying patients at a cost not exceeding the cost per day for public ward patients, such cost including all extras or special treatment.
3. Semi-private wards at a rate not exceeding \$1.00 a day in excess of the charges for semi-public ward patients.
4. Private wards.

It is recommended that hospitals be asked to furnish, if desired, special graduate nurses for patients in classes two and three at the rate at which the hospitals pay for permanent staff nurses, and that hospitals be prepared to furnish on a group basis graduate nurses for patients in classes two and three, if desired.

Provincial and municipal grants should be payable in the case of infants as well as of adults.

The cost of nursing and x-ray treatment should be lessened in the case of paying patients.

Special protection should be given hospitals as regards traffic accidents.

Social service and dental departments should be established.

TUBERCULOSIS SANATORIA

The Commissioners hold that sanatoria for tuberculosis should be treated in the same way as general hospitals as regards public grants.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

Moreover, the government should meet one-half the cost of any new sanatorium or of additions to existing ones.

Each sanatorium for tuberculosis should be specially aided to maintain preventive extension clinics.

Neither general hospitals nor sanatoria should be required to admit patients having venereal disease. These should go to isolation hospitals.

MENTAL HOSPITALS

The mental hospitals in the Province of Ontario were thoroughly studied by the Commissioners and many recommendations are submitted. Of general interest are those recommending:—

A charge in the form of certificate required for commitment.

The immediate erection of a hospital for mental diseases to serve northern Ontario.

That all new mental hospital construction, except possibly a psychiatric hospital, should be a combination of the cottage and "block" system.

That the government establish a psychiatric hospital for research and training in mental hygiene.

That the medical superintendent should be in complete control of the hospital and all connected with it.

The present law should be amended to permit the admission and detention of alcoholic and drug addicts.

Two or three of the larger of the existing mental hospitals, or some of the general hospitals, should have a special ward for alcoholic and drug addicts.

CORRECTIVE INSTITUTIONS

The reformatories received considerable commendation in this report, but the jails received what was termed a "savage slashing" by one of the daily papers. The jails, say the Commissioners, "are inferior in nearly every sense of the word The forty-seven jails of the province are forty-seven places which are as likely to promote offenses as to prevent them. Little classification of prisoners exist. Old and young, first offenders and hardened offenders, innocent (unconvicted) and guilty, sane and insane, strong and weak, drunkards, drug addicts and sober are generally more or less herded together The great majority remain idle. The food is poor"

The Commissioners recommend that the general courts should endeavour to make as much use as possible of suspended sentences and a more extensive practice of probation.

They also recommend that the jails insist on full time labour for convicted prisoners. "In the case of offenders of the drunk and disorderly type, or tramps sentenced to jail, the law should

prescribe hard labour for eight hours a day, even if only breaking stones. At present, such offenders usually lie around the jail enjoying themselves. One term of real hard labour would probably destroy a lot of disorderliness and banish a lot of tramps."

In every jail there should be a strict separation of repeaters from first time offenders.

A radical solution of the jail problem would be for the government to take over the responsibility for the jails, abolishing present jails, and charging the costs to the municipalities concerned.

OTHER RECOMMENDATIONS

Many other phases of social welfare are considered in this comprehensive report, and interesting recommendations are submitted concerning the care of backward children, handicapped children such as the crippled, blind, and deaf and dumb, and the industrial schools. The early capital expenditure of approximately twenty million dollars is recommended for the construction or replacement of various mental hospitals, industrial schools, and the provision for the care and treatment of alcoholic and drug addicts.

The construction of a provincial cancer hospital, costing from one to two million dollars is recommended. The alternative proposal is the provision of special aid to cancer research in the universities and to special cancer wards in the larger general hospitals.

In considering the increased capital and maintenance expenditure which the proposals embodied in this report would entail, the Commissioners made reference to the Quebec hospital tax which provides a revenue of approximately six hundred thousand dollars, and suggested that possibly some such tax could be instituted in Ontario.

A PUBLIC WELFARE DEPARTMENT SUGGESTED

In addition to suggesting that the supervision of hospitals and of the physical health of the province be concentrated in the Department of Health, the Commissioners concluded their report by suggesting that the present government supervision of social and corrective institutions and agencies might be strengthened by the creation of a Public Welfare Department under a cabinet minister, under whom would be directors of mental hygiene, psychiatry, child welfare, adult relief, handicapped children, adult corrective institutions, juvenile delinquents, supplies and products, and a director of inspection.

The press release of this report indicates that considerable time and thought has been given to the consideration of hospital problems, and it is of interest to social workers to note that many of the recommendations of the hospital association and other provincial organizations have been embodied in this report. It is hoped that the government will see fit to endorse the suggestions of this report and thus correct many abuses prevailing at the present time.

THE HOSPITAL MEETING IN BRITISH COLUMBIA

One of the outstanding hospital meetings of the year was that held in Vancouver during the month of August when a joint meeting of the British Columbia Hospitals' Association, the Western Hospital Association and the Northwest Hospital Association brought together the leaders in hospital work from western Canada and the Pacific states. The meetings were under the direction of Mr. J. H. McVety, the president of the British Columbia Hospitals' Association and Mr. G. W. Olson of Los Angeles, the vice-president of the Western Hospital Association, the latter presiding in the place of the president, Dr. F. C. Bell, of Vancouver, who was unable to attend through illness.

Many problems of interest to those engaged in hospital work were taken up during the four days of the sessions. "The Effect of State Health Insurance on Hospital Finances and Economics" was discussed by Mr. C. H. Gibbons, the secretary of the Royal Commission on State Health Insurance and Maternity Benefits for British Columbia; "University Courses for Nurses" were considered by Miss Mabel F. Gray, R.N., Assistant Professor of Nursing at the University of British Columbia; "Should the Small Hospital Conduct a Training School?" Clara E. Jackson, R.N., Duncan, B.C.; "The Hospital, the Doctor and the Patient," Dr. Howard H. Johnson, San Francisco.

An excellent luncheon address on the various types of hospital staff organization and their respective advantages was delivered by Dr. W. B. Burnett of Vancouver. A study of "The Ratio of Hospital Personnel to Patients," by Dr. M. T. MacEachern will be reviewed elsewhere. Dr. George A. Greaves, of the Vancouver General Hospital, spoke on "The Value of Physical Therapy," and Dr. Harvey Agnew, of the Canadian Medical Association, was invited to speak on the "Relationship of the Medical Profession to the Hospital." In discussing the increasing amount of money granted to British Columbia hospitals, Dr. H. E. Young, the Provincial Health Officer, sounded a warning that the difficulty of financing these grants would materially affect the attitude of the government with respect to further increases.

The convention was fortunate in having the opportunity to hear the system of the Victorian Bush Nursing Service (Australia) explained by one of its staunchest supporters, Sir James Barrett, K.B.E., C.B., C.M.G., F.R.C.S., of Melbourne. The growth of this unique system of nursing service during the last few years has been remarkable and was well illustrated on the screen by photographs and charts.

The City of Vancouver took the occasion of this convention to make a presentation to one of its former citizens, Dr. M. T. MacEachern of Chicago. Doctor MacEachern, formerly medical superintendent of the Vancouver General Hos-

pital, was one of a committee of three experts which recently made a comprehensive survey of the hospital needs of greater Vancouver and, in recognition of his excellent contribution to this survey, he was presented by his Worship Mayor Malkin on behalf of the city with a magnificent tea service. The presentation was most graciously made and accepted.

PLANS FOR INTERNATIONAL HOSPITAL CONGRESS IN 1931

The success of the first International Hospital Congress, which was held last June at Atlantic City and which was attended by representatives of more than forty countries, was so marked that it was decided to hold a second International Hospital Congress in 1931 in the city of Vienna. In accordance with this arrangement the Chairman of the International Hospital Committee, Dr. René Sand, Belgium, called together members of the Committee in Paris on June 25th.

It was agreed to hold the second Congress in Vienna from June 8th to 13th, 1931. Preparations in Vienna for the reception of the delegates are in the hands of the vice-president of the committee, Professor Tandler, who is a health commissioner for Vienna. According to present plans the sessions will be held during the mornings, leaving the afternoons free for organized visits to places of interest. A number of commissioners have been appointed to study and report on various hospital problems. It is hoped that delegates going to the convention will be able to join the American party in London, proceeding further to Denmark and Germany. From Passau

the party will proceed to Vienna by steamship. The Committee recommended that a visit to Budapest be organized.

The preliminary draft of the program includes the following papers: "Dispensaries," Dr. E. H. L. Corwin, New York City; "Nutrition," Professor Von Noorden, Vienna; "Effect of Health Insurance on Hospital Practice," Dr. Smith Whittaker, London; "The Place of Neurology and Psychiatry in the General Hospital," Dr. Alter, Düsseldorf. The organization of an International Hospital Association was taken up by the Committee. It was decided that such an association should be composed of national hospital associations, and members of the council of this association would consist of twelve experts on hospital questions; there would be one delegate from each country appointed by the government. It was also recommended that an international hospital bureau be created in New York.

The publication of an international year book, to be continued by the International Hospital Quarterly Magazine, and to be called *Nosokomeion* was forecast by Geheimrat Dr. Alter, of Germany, who has been asked to edit the year book by the Kohlhammer firm in Stuttgart. The first number will be devoted to the relation of the medical profession to hospitals, the second, to the relation of the nursing profession to hospitals, the third, to the topics of the Vienna Congress, the fourth to the economic and administrative problems of hospitals. The magazine will publish articles in English, French, or German, with brief translations in the other languages, as well as a bibliography.

Provincial Association Notes

THE ALBERTA MEDICAL ASSOCIATION

The annual meeting of the Alberta Medical Association was held in Winnipeg during the afternoon and evening of August 25th. One hundred and thirty members attended from various parts of the province and from the point of view of attendance, this was one of the largest in the history of the Association. The meeting of the British Medical Association was the great added attraction. There was no scientific program and the afternoon session was chiefly a business meeting though subjects of general interest were discussed.

Dr. M. R. Bow, Deputy Minister of Health in this province, stated that more deaths result from cancer than from any other disease in Alberta. The special committee recently appointed, urged members of the Alberta Medical Association to recommend that the Provincial Government appoint a cancer commission, to go more thoroughly into the study of the prevalence of the disease and its cure.

A summer school for post-graduate studies which was recommended a year ago, was found by a special committee to meet with the approval of the majority of the profession. This proposed scheme will be in the hands of the Medical Department of the University of Alberta and will receive further consideration.

During the evening a dinner was held at the Fort Garry Hotel where the members had the pleasure of listening to the Honourable Dr. E. W. Montgomery, Minister of Health in Manitoba and to Dr. Alfred Cox, C.B.E., Secretary of the British Medical Association. The Honourable Dr. Montgomery spoke in a very interesting way on "Some problems of the medical practitioner." Dr. Cox outlined the present status of the National System of Insurance in Great Britain and the effect which it is having on physicians there. Under the panel system of this form of insurance (a) every patient has a free choice of the physician he wishes to attend him during illness. (b) The patient is permitted

to change his physician every two weeks if he so desires. (c) Any physician may become a "panel" doctor if he wishes. (d) A physician may have private as well as "panel" patients but he is permitted to have not more than two thousand "panel" patients. (e) Small deductions are made from the wage earners as well as from employers while the government adds an amount equal to two-ninths of the sum contributed by the former two. (f) The physician receives nine shilling for each patient a year. (g) The average number of panel patients for each physician is less than one thousand; and the average attendance for each patient is four and a half calls a year, at the home of the patient and at his office, in the proportion of two calls at the home to five at the office. (h) An Appeal Board considers disputes between a physician and his patient. (i) The panel system includes only those who are employed and work with their hands. It does not include medical services to members of the patient's family unless they are workers with their hands.

The following is the list of officers of the Alberta Medical Association elected for 1931-1932; *Past-President*, Dr. R. Parsons, Red Deer. *President*, Dr. T. R. Ross, Drumheller. *First Vice-President*, Dr. H. A. Gibson, Calgary. *Second Vice-President*, Dr. T. W. E. Henry, Fort Saskatchewan. *Secretary*, Dr. G. R. Johnson, Calgary. *Treasurer*, Dr. N. L. Terwillegar, Edmonton. *Executive Committee*: Dr. F. H. Sutherland, Peace River. Dr. R. M. Reid, Vegreville. Dr. R. F. Nicholls, Edmonton. Dr. O. Boyd, Medicine Hat.

Representatives On the Council of the Canadian Medical Association, in addition to the President and the Secretary: Dr. G. E. Learmonth, Calgary, Dr. P. M. Campbell, Lethbridge, Dr. W. D. Chapelle, Edmonton, Dr. J. L. Clarke, Didsbury, Dr. A. H. Meneely, Coronation.

Editorial Committee for the Journal of the Canadian Medical Association: Dr. G. E. Learmonth, Calgary, Chairman; Dr. H. C. Dixon, Medicine Hat, Dr. P. M. Campbell, Lethbridge, Dr. Harold Orr, Edmonton, Dr. T. H. Whitelaw, Edmonton.

G. E. LEARMONTH

THE ANNUAL MEETING OF THE SASKATCHEWAN MEDICAL ASSOCIATION

The spectre of state medicine hovered larger than ever over the annual meeting of the Saskatchewan Medical Association which was held in Winnipeg on August 25th. Some members said that state medicine was coming; others said it was here; some said laymen should never dictate to professional men what their services are worth; others said the doctors should try

to get the viewpoint of intelligent laymen who are studying this subject. A resolution asking that the College of Physicians and Surgeons survey the condition of medical services in Saskatchewan was passed.

The office of secretary was made a full-time paid position, and applications for this position will be received by the executive. During the discussion of this motion some members felt that there was no need for a change, as matters regarding the profession were being well looked after. Others reminded those present that there was always a hasty emergency gathering whenever legislation affecting doctors was about to come up in the house and that often legislation vitally affecting doctors was passed without their knowledge, for example, the recent act regarding notification of indigent cases.

The cancer committee recommended the formation of a Canadian Society for the Prevention of Cancer. Nearly all of the other recommendations of this committee had been adopted by the provincial government at the last session of the house.

The following officers were elected for the coming year: *Honorary President*, Dr. W. A. Dakin, Regina; *President*, Dr. R. A. McLurg, Wilkie; *First Vice-president*, Dr. J. E. Bloomer, Moose Jaw; *Second Vice-president*, Dr. R. H. Macdonald, Saskatoon.

LILLIAN A. CHASE

THE PRINCE EDWARD ISLAND ASSOCIATION MEETING

The annual meeting of the Prince Edward Island Medical Association was held in Charlottetown, July 9th. There was a good attendance and excellent programs at both morning and afternoon sessions. The visiting doctors present were, Dr. A. T. Bazin, Montreal, President of the Canadian Medical Association, Dr. R. E. Wodehouse, Ottawa, General Secretary of the Canadian Tuberculosis Society, Dr. A. T. Miller of the Kentville Sanatorium, and Drs. Byrne and Campbell, also of Nova Scotia.

Dr. Bazin, on behalf of the Canadian Medical Association, discussed the following subjects: 1st. The advisability of appointing full time provincial secretaries. 2nd. That the dates of the annual meetings of the three Maritime Provinces be changed to permit of these meetings being run consecutively. This measure would make it easier for Canadian Medical Association officials to attend all three meetings. 3rd. The Blackader Fund. 4th. Periodic Health Examinations. 5th. Extra-mural Lectures. 6th. The Nursing Survey. 7th. Drug Addiction.

Dr. Preston MacIntyre in his presidential address gave an excellent survey of medical pro-

gress in Prince Edward Island. Interesting papers were read by Dr. Bazin on Surgical Problems of Diabetics; Dr. Wodehouse, on Dr. VonPirquet's last medical communication; Dr. F. W. Tidmarsh, on Common diseases of Infancy; and Dr. R. F. Seaman, on Acute Primary Peritonitis.

The following have been elected officers of the Prince Edward Island Medical Association for the ensuing year.

President, Dr. J. E. Fleming; *Vice-President*, Queen's County, Dr. J. P. Lantz; *Vice-President*, Prince County, Dr. J. Simpson; *Vice-President*, King's County, Dr. L. Brehaut; *Treasurer*, Dr. I. J. Yeo; *Secretary*, Dr. J. W. McKenzie,

Executive Committee, Drs. E. T. Tanton, G. F. Dewar, and B. C. Keeping; *Auditors*, Drs. G. L. Smith and J. Jardine; *Editorial Board*, Drs. J. A. MacPhee and R. F. Seaman; *Members of Canadian Medical Association Council*, Drs. J. F. MacNeill, J. A. Johnson and P. MacIntyre; *Members of Prince Edward Island Council*, Drs. E. T. Tanton, J. F. MacNeill, G. F. Dewar, H. D. Johnson, W. J. P. Macmillan, I. J. Yeo and R. F. Seaman.

The very sincere thanks of the association were extended to the retiring secretary, Dr. G. F. Dewar, for his arduous and unusually efficient service over a period of eleven years.

J. W. MCKENZIE

Medical Societies

THE FEDERATION OF MEDICAL WOMEN OF CANADA

The annual meeting of the Federation of Medical Women of Canada was held in Winnipeg on August 25, 1930. The gathering included many of the medical women practising in Canada, together with some who had returned from the foreign mission field. Notable among the latter were Dr. Margaret McKellar who has been a missionary in India for forty years, and Dr. Story-Cunningham, returned on furlough from China. The following officers were elected:—

President, Dr. Isobel Thomas Day, Vancouver; *Vice-Presidents*, Drs. Mabel Patterson, Dartmouth, N.S.; Mabel L. Hanington, St. John, N.B.; A. C. Macrae, Prince Edward Island; Maude E. Abbott, Montreal; Rowena Hume, Toronto; Frances McGill, Regina; and Geraldine Oakley, Calgary; Mary E. Crawford, Winnipeg; *Corresponding Secretary*, Dr. Helen MacMurchy, Ottawa.

On Wednesday evening, August 27th, the women physician members of the British Medical Association were guests of the medical women of Canada at a largely attended dinner, held in their honour in Picardy's banqueting hall, and presided over by Dr. Mary E. Crawford. Among the speakers of the evening were Miss Margaret Basden, M.D., F.R.C.S., and Dame Louise McIlroy of London, who responded in a very charming way to toasts to "The International Federation of Medical Women" and "Our Guests" proposed

by Drs. Helen MacMurchy and Maude E. Abbott. Another interesting feature was the delivery by Dr. M. Ellen Douglass of Winnipeg of an address outlining the life-story of Dr. Charlotte W. Ross, the pioneer medical woman of Manitoba (and indeed of all Canada), who, impelled by the needs of her community, began the study of medicine in 1865, when already a wife and the mother of four children. After obtaining the degree of M.D. at the Woman's Medical College of Pennsylvania in 1875, she returned with her husband to his headquarters at Whitemouth, Man., and carried on an active practice there for over thirty-five years under conditions of great difficulty.

In direct sequence on this address, a short memorial service was held on the following day, August 28th, at 7.30 a.m. in honour of Dr. Charlotte Ross, in Brookside Cemetery and attended by members of the Federation and her descendants. Three prayers were said in unison by those assembled at her grave and a wreath was placed upon it by her granddaughter, Dr. Edith Ross, who now holds the post of chief anæsthetist at the St. Boniface Hospital. This simple tribute to a noble life, which successfully united the complex functions of a devoted wife and mother, with the no less intensive claims of a large surgical and obstetrical practice in a district beyond the reach of other professional aid, and amid climatic conditions of great rigor, lives as a real inspiration in the memory of all those who were privileged to share in it.

MAUDE E. ABBOTT

University Notes

McGill University

The honorary degree of LL.D. was conferred on Lord Moynihan by McGill University on September 18th, at a special convocation. Lord Moynihan was introduced by Dr. E. W. Archibald who referred to his many and varied achievements as a surgeon, a writer and an orator.

After the conferring of the degree Lord Moynihan expressed his appreciation of the honour in the clear, graceful phrases of which he is such a master. He referred to Dr. Archibald as one to whom Lord Lister would have applied his favourite term of "trust-worthy". "Teamwork" in our fight against disease he claimed as a word coined by himself about thirty years ago. It should run through all departments of a university so that a principal would be able to say, as did Lord Nelson in his despatches after the Battle of the Nile, that he was in command of a band of brothers. A university he thought, should be not only a sanctuary for old thoughts, but a laboratory for the new.

University of Western Ontario

Dr. H. Alan Skinner has been promoted from Assistant Professor to Associate Professor of Anatomy; Dr. Madge T. Macklin from Instructor in Anatomy to Assistant Professor of Histology and Embryology; Dr. R. A. Waud from Assistant Professor to Associate Professor of Pharmacology; Dr. John H. Fisher from Associate Professor to Professor of Bacteriology;

Dr. A. J. Slack from Assistant Professor to Associate Professor of Public Health; Dr. E. M. Watson from Instructor to Assistant Professor of Pathological Chemistry; Dr. F. R. Clegg, from Assistant to Associate Professor of Obstetrics and Gynaecology; Dr. W. P. Tew from Assistant to Associate Professor of Obstetrics and Gynaecology; Dr. C. A. Cline and Dr. W. E. Pridham have been appointed Instructors in Anatomy. Drs. R. B. Burnett of Durham, G. H. McGuffin and J. E. Sharpe of London have been appointed Instructors in Pathology and Bacteriology succeeding Dr. G. H. Jordan who is an Interne at the Howard A. Kelly Hospital, Baltimore, Dr. Frank S. Kennedy, who is a Resident Physician at State Hospital, Utica, N.Y., and Dr. Kenneth T. MacFarlane, who is an Interne at the Montreal General Hospital. Dr. J. L. Callaghan, Resident of Victoria Hospital, has been appointed Instructor in Surgery. Dr. Frank W. Poole, of St. Thomas, succeeds Dr. A. E. Mowry, L.M.A.A., Interne of the Royal Victoria Hospital, Montreal as Meek Fellow in Obstetrics and Gynaecology and Dr. F. S. Vrooman succeeds the late Dr. W. J. Robinson as Associate Professor of Psychiatry.

Dr. G. C. Ferguson, Instructor in Anatomy resigned and is in England studying for the F.R.C.S. examination. Dr. A. A. James, Assistant Professor of Biochemistry, resigned and is attached to the R.C.A.M.C. at Halifax, N.S. A course of ninety-six hours in Embryology has been added to the second year of the pre-medical curriculum. The course in Physics No. 10 of the first year has been replaced by Physics No. 11.

ILLEGAL ABORTION.—Often when a doctor is called in to treat a woman who is having or has had an abortion, he may suspect that its cause has not been natural, and he may indeed be virtually certain that attempts have been made to procure illegal abortion. If any intra-uterine manipulation has been done there is always grave risk of infection, so that a doctor may find himself in the position of treating a woman for abortion who may die from the effects of infection introduced before he saw her, and be faced with the responsibility of a coroner's inquest and possibly the suspicion that he himself has procured the abortion. If a doctor is called in to treat an abortion it is, of course, his duty to save the woman as far as possible from danger, but if he suspects or has reason to know

that abortion has been procured by any means, he should certainly call in another doctor in consultation. If this is not done and the patient dies there may be no evidence whatever except his word to disprove an accusation against him of illegal practice, whereas the support of another doctor may help to save him from disagreeable suspicion. If the patient recovers from an abortion which the doctor virtually knows has been induced the general opinion is that there is no need for him to make a statement to the police; but if the patient should die and he is in any way suspicious of the cause of the abortion, it is his duty to report the matter to the coroner. He should on no account sign the death certificate.—J. P. Hedley, F.R.C.S. Eng., Obstetric Physician to St. Thomas's Hospital.

Special Correspondence

The London Letter

(From our own correspondent)

The interim report of the departmental committee of the Ministry of Health on maternal mortality and morbidity was issued early last month and caused a great deal of interest. The fact that the maternal mortality rate has not decreased at all and has even increased slightly during the last twenty years of medical advance and public health activities has been disturbing the authorities, and three years ago a strong committee began to look into the matter. One of the most important sections of a very interesting report deals with an investigation into the cause of maternal death. A form of inquiry was drawn up and the medical officer of health of the appropriate district was invited to be responsible for the completion of these forms. Two expert medical examiners then analysed these records, of which over 3,000 were received between November 1928 and April 1930. Only the first 2,000 cases are considered by the committee and of these 1,596 were set aside as cases where the death was directly due to pregnancy or childbirth. In this series a certain number of cases were found where there appeared to be a "primary avoidable factor" in the train of events which led up to the fatal result and it is significant that when allowance is made for those cases about which there was insufficient information nearly half the total number of deaths due to childbirth were associated with this primary avoidable factor. Such factors have been subdivided into the four headings of omission or inadequacy of antenatal care, error of judgment in management of the case, lack of reasonable facilities and negligence of the patient or her friends. In other words half the deaths in childbirth are preventable and as usual in preventive medicine the keynote of attack on this state of affairs is education. Here the committee make very strong recommendations to the General Medical Council that the time allotted to midwifery etc. in the syllabus shall be doubled, (it was only a few years ago that it was increased) and among other things that the medical student shall be given priority over the pupil midwife in maternity hospitals. Coming so soon after the discussions upon the possibilities of a national midwifery service this report should serve to show how this very serious problem can be dealt with, and at any rate the facts are now before the profession and the public.

The eleventh international veterinary congress has just been meeting in London under the presidency of Sir John McFadyean. It is in many ways an appropriate moment for this to have happened, for alongside with the recognition of the importance of veterinary science to public

health work there has been a deplorable lack of support for the work carried on by the Royal Veterinary College in London, with the result that the board of management is faced with possibilities of having to close down. There is a tendency for the public to take too much for granted, and because it is now possible to buy "certified" milk it is assumed that bovine tuberculosis is a thing of the past, whereas, as one of the speakers at the congress pointed out there are still less than 500 licensed tubercle-free herds in Great Britain. It was refreshing to find very high ideals for milk being laid down by one authority, who remarked that in really first class milk *B. coli* should not occur and there should not be found more than some few thousands of bacteria per cubic centimetre. More hopeful matter discussed was concerned with anthrax and it appears that careful regulations and inspection have gone far towards abolishing this disease among humans. Dr. Guérin of Paris was at the congress to talk about his "B.C.G." vaccine for tuberculosis, but his speech as published in a summarized form did not refer to the Lubeck disaster. A method which has such risks may be justifiable for animals but not for humans and it cannot be said that the veterinarians were enthusiastic about it. On deficiency diseases the congress sounded a very moderate note, and it is refreshing to find that in the animal world as well as for human patients, in the words of one speaker, the importance of the individual vitamins is frequently overestimated. It may seem out of proportion to write even these few words about veterinary medicine, but Pavlov's work is bound in course of time to influence profoundly many of the accepted ideas on physiology and pathology and the application of other aspects of animal life to the human subject may help in the fight against disease. Anyway it is the experience of many dog owners that what they have learnt in managing these four-footed creatures has greatly helped in the bringing up of children!

Two interesting commemorations have recently occurred. Sir Ronald Ross was entertained to a luncheon in celebration of the thirty-third anniversary of the discovery of the life cycle of the malarial parasite, and this was particularly appropriate for this year is both the 300th anniversary of the discovery of quinine and the hundredth anniversary of the birth of Sir Clements Markham who transplanted the cinchona plant from Peru to India and made this expensive drug available for the poorest peasant. The other commemoration was the hundredth birthday of Dr. Harriet Clisby who in this age of record breaking by the female sex can claim to be the oldest woman doctor. Needless to say she qualified under great hardships and had to

cross to America to be allowed to take her degrees. Now at the age of 100 she was found by a reporter vigorously engaged in physical jerks on one of the hottest days of the year!

ALAN MONCRIEFF.

London, September, 1930.

The Edinburgh Letter

(From our own correspondent)

The Duke of York visited Fort William, Invernessshire, on the 30th of July. With the exception of two private shooting visits by the late King Edward VII, this is the first occasion that the district has been so honoured since the late Queen Victoria went to Lochaber in 1873. There was a time when a Royal Duke would have ventured into Wild Lochaber only at his own risk, but these days are now happily far past. The present occasion was an important one. The principal duty undertaken by His Royal Highness was the opening of the new operating theatre in the Belford Hospital. This addition is a memorial to the late Dr. Cameron Millar, who was referred to as "Lochaber's beloved physician."

Dr. Millar practised for nearly half a century in Fort William, and was for forty-one years medical superintendent of the Belford Hospital. Being first and always a Lochaber man he spoke Gaelic as readily as he did English. He was a scholar as well as being a doctor, and his "Special Study of the Medical Work in a Mainland District in the Highlands" which he contributed to Sir Leslie Mackenzie's "Report on the Physical Welfare of the Mothers and Children of Scotland" is a masterpiece of clear thinking and lucid description. Scotland is dotted over with memorials to local doctors who have served their generation well and faithfully. Among these tributes few have been more worthily earned than Dr. Millar's, in the capital of his own country. The Hospital is partly maintained by voluntary subscriptions, but is in receipt of a grant from the Department of Health for Scotland. It forms part of the comprehensive scheme to provide surgical treatment to the Highlands and Islands of Scotland.

With the sailing of the First Cruiser Squadron and the closing of the Naval Base at the end of the war the glory has departed from Rosyth. While mementos of the war years are still to be seen in the gigantic cranes which stand along the piers and breakwaters, relics of a more dismal nature are to be found in the tiny churchyard, which lies beyond the dockyard on the road to Limekilns. Here is a striking reminder of the days when the Resurrectionists flourished, and there was an insufficient supply of bodies legitimately procured, available for the dissecting rooms. This remnant is a large vault with massive walls, a roof of heavy stone slabs and a strong iron-studded door furnished with powerful

bolts. In its lonely position on the north side of the River Forth, easily accessible by boat, the churchyard was frequently visited by the body-snatchers. So persistent were the visits and so constantly were the graves desecrated, that this strong room was built for the purpose of protecting the dead. Here safely locked within its stony walls the bodies were kept until Nature's processes rendered them unfit for dissection purposes. Then and not till then would interment take place. As an additional precaution, watch against invasion of the ghoulish raiders was kept from a small hut, which still stands, bearing mute testimony to the gruesome practices of former days. Memories of those times die hard, and one is almost forced to the belief that Edinburgh is not altogether ashamed of that sordid page in its history, and is inclined to linger in the past like some respectable middle-aged citizen recalling some doubtful episodes of his youth which he is reluctant to forget. Possibly for this reason, Edinburgh was selected recently for the production at its leading theatre of a play called "The Anatomist." This drama deals with the Burke and Hare murders. The author is understood to be a Glasgow doctor who conceals his identity under the pseudonym of James Bridie. The methods of the murderers by whose activities the dissecting rooms at Surgeons' Hall were supplied with the bodies of their sixteen victims are realistically portrayed. Dr. Knox, Mary Paterson, Burke and Hare, as well as several minor characters of historic interest, are presented. The play was well received by large audiences. This theme of Burke and Hare on the stage is no new one to Edinburgh audiences. It was a favourite Saturday night play at all seasons many years ago. To give the production as air of respectability it was variously billed as "Bonnie Mary Paterson," "Old Edinburgh," or "Daft Jamie," the last being the name of one of the victims of the murderers. As former audiences believed in blood and realism, the murders were done on the stage. As these were highly realistic, they called for strength and endurance on the part of the actors. We live now in more regenerate days and in the present play a polite veil is drawn over the more lurid portions of the drama.

The solitude of St. Kilda is to be undisturbed in the coming years. The roar of the breakers beating on those desolate islands will be uninterrupted by the voice of man. For the first time for centuries these rocks are to be deserted. The thirty-six islanders who remain are to be transported elsewhere, and work and homes provided for them by a benevolent government. St. Kilda has been inhabited from at least the second century of our era, and the Norsemen were in full possession of these lonely rocks for 300 to 400 years. At one time the settlement was used as a penal colony for persons committing misdemeanours on the lands under the jurisdiction of the Macleod of Macleod. Lady Grange, the wife of one of the Lords of Session, was

clandestinely removed and detained there for eight years (1734-42) through the intrigues of her husband, and with the connivance of the notorious Simon Fraser, Lord Lovat, and other Jacobite sympathisers. Boswell once told Johnson that he thought of buying the islands. The Doctor at once replied, "Pray do, Sir. We will go and pass a winter amid the blasts there. We shall have fine fish, and we will take some dried tongues with us and some books." St. Kilda possesses a certain medical interest on account of the *cuatana gall* or boat-cough. This was supposed to afflict the people whenever a vessel visited the island. This malady was first mentioned by Martin who visited St. Kilda in the summer of 1697, and nearly every other writer who has described the islands has referred to it. The belief in it was widespread in the time of Dr. Johnson, who had his joke about it when he visited the Hebrides in 1773. As parallel instances may be cited the remote island of Tristan d'Acunha in the South Atlantic, and the island of Wharekauri, one of the Chatham Group about 480 miles east of New Zealand, where similar disorders with the same alleged origin are said to occur.

Another disease which formerly afflicted the children on St. Kilda was the eight-day sickness or *trismus nascentium*. At least one half of the children on the island used to die of this disorder. The last death from infantile lockjaw on St. Kilda occurred in 1892, though deaths still attributable to this cause occur in the neighbouring islands. The present inhabitants, a poor remnant of a population that once numbered upwards of 200, are not filled like Dr. Johnson with a desire to spend any more winters on the island. The last severe winter, one of the worst in recent years, has convinced them that their destiny lies amid less inclement surroundings. They are unanimous in their desire to leave this bleak, barren outpost in the Atlantic. The Secretary of State for Scotland has been petitioned, and he has decided to assist the St. Kildians in their migration before the present summer is ended. This disposal of a minor communal settlement will afford an interesting demonstration of State enterprise and will be watched attentively.

GEORGE GIBSON.

23 Cluny Terrace, Edinburgh.

Letters to the Editor

The Book of Canada

To the Editor:

"THE BOOK OF CANADA" will doubtless prove to be one of the most valued souvenirs of the 98th annual meeting of the British Medical Association. Moreover because of the standing of the various contributors the volume will be regarded, for some years at any rate, as authoritative on the matters with which it deals. I make no apology therefore for asking you to call the attention of recipients of THE BOOK OF CANADA to the following inaccuracies. On page 161 in the article Recent Medical Developments in Canada, the author after epitomizing the requirements of the various Canadian Medical Schools as regards premedical University study, proceeds: "The years of registration in the Faculties of Medicine consequently differ, being six years in Toronto, Queen's and Alberta, five in McGill, Dalhousie, Laval and Montreal, and four in Manitoba and Western. The period after leaving school spent in study is seven in McGill and five in Laval, six in all the others".

The words containing the inaccuracies I refer to I have italicised in the quotation. The Manitoba Medical School instituted a straight five year course in Medicine in the session 1905-06, at which time the entrance requirement was the University (junior) matriculation. In the year 1914-15 this latter requirement was raised to senior matriculation (one year of the University Arts and Science course), and beginning with the session 1922-23 our entrance requirement

has been the first two years of the Arts and Science course. "The period after leaving school spent in study" is seven years and since the session 1922-23 has at no time been less. The fifth year has been a (compulsory) interne year for the past eight or nine years, but these internes are under University supervision, receive University instruction and must pass a University examination in the clinical subjects in order to qualify for graduation.

In the article immediately preceding the one herein referred to, and entitled "A Sketch of Medical Education in Canada", the requirements, so far as Manitoba is concerned, are quite correctly stated.

S. WILLIS PROWSE,
University of Manitoba,
Medical College, Winnipeg, Sept. 17, 1930.

To the Editor:

I regret the inaccuracy in "THE BOOK OF CANADA" in regard to the period of registration in Manitoba. The error arose from my not considering the interne year of the University of Manitoba as a year of registration in the Medical Faculty of that University.

V. E. HENDERSON
University of Toronto, Sept. 26, 1930.

State Sickness Insurance

In Dr. C. H. McKenzie's letter in the August *Journal* the term "antitoxin" was used. This is an error, as "toxoid" or "anatoxin" is the substance he used in immunization against diphtheria.

Topics of Current Interest

Two Accidental Deaths in Belgium Due to Faulty Administration of Antidiphtheric Vaccine

Professor Bessemans outlines the history of 25 fatalities since 1919 in various parts of the world from accidental administration of toxin, or of antitoxin containing excess of toxin, from action of extreme cold in freezing out the protective phenol, and contamination with virulent staphylococcus. He describes in detail the history of two children, one 14 and the other 5 years old, after injections with presumed toxin anti-toxin. The symptoms were characterised by intense local reaction, with little general disturbance; a febrile condition sets in after a time, and after a few days gradually subsides, death supervening from hyperthermy. The older child died 7 days after the second injection (the first having given rise to no undue symptoms) the other child died after 13 days from the first injection. In the second case, it was definitely shown that of three toxin ampoules given the operator for Schick-test dilution, one was missing afterwards when search was made. Forty-five children had been vaccinated at the same time as the first child had come to no harm. The author believes that both cases were due to the use of an ampoule of toxin by mistake for antitoxin. He points out that immunisation could not have occurred with the first child between the first and second injections (8 days), nor could there be any question of a negative phase. His opinion is borne out by experiments on guinea-pigs to which lethal doses of diphtheria toxin were administered. The curve of temperature fall and the succession of local reactions were identical. Cases of self-administered diphtheria injections followed by anti-diphtheric injections have followed a similar course to that mentioned, but eventually the necrosis and exudate, etc., have slowly cleared up (over 14 weeks). The contents of the above ampoules gave a minimum lethal dose for a standard guinea-pig of 1/125 c.c. The children weighed 32.5 and 16 kilos respectively. The scientific interest of these two cases lies in their showing a distinct parallelism between the reaction of a child and a guinea-pig, the resisting power of the former being considerably stronger. They supply definite information previously lacking as to what constitutes a minimum lethal dose of diphtheria toxin for human beings. He considers that it is feasible to obtain the approximate lethal dose of diphtheria toxin for a non-

immunised man, by dividing his body-weight in kilos by 250 grm. (the standard guinea-pig weight), and multiplying the figure so obtained by the minimum lethal dose for a guinea-pig of 250 grm. body-weight. To guard against repetition of similar errors in handling the toxin and toxin anti-toxin, he advises, among technical aseptic and antiseptic methods, colouring the anti-diphtheric vaccine, either toxin antitoxin or anatoxin, and its receptacles, labels, and wrappings with a characteristic colour, say green: this colour he uses after the Pasteur Institute usage, by making up a saturated solution of methylene blue in alcohol, sterilised at 100°, to which he adds 0.5 c.c. per litre of anatoxin ready for use. The toxin, he recommends, should have the receptacles, labels, etc., coloured red for danger, and the labels marked "poison" and "danger of death" in prominent letters. Ampoules, etc., should be of distinctive shape, colour, etc. All samples which are cloudy, non-homogeneous, or have undergone change through extreme heat or cold should be rejected. In the case of suspicious symptoms, have recourse to extensive and prolonged serotherapy. When handing over preparations for use, definite warnings as to usage, toxicity and so on should be given every time.—A. Bessemans, in *Rev. Belge. d. Scien. Med.* 1: 7, 597. Abs. in *J. of State Med.*, Aug. 1930.

The Viper as a Therapeutic Agent

As is well known, animal derivatives, some of them exceedingly nasty, were a prominent feature in the early pharmacopœias. The idea seemed to prevail that almost anything belonging to the vegetable and animal kingdoms had a therapeutic value, and the nastier and the more appealing (not to say, appalling!), the better. It is not likely, however, that all of these substances had no rationale; empiricism was rife, and some at least stood for long the test of clinical experience. It is possible, indeed, that some of the substances in question depended for their efficiency on the presence of alkaloids or hormones. Among such substances may be mentioned parts of the viper, which were, curiously, retained in the French Pharmacopœia as late as 1884.

Lately, Professor Billard, of Clermont-Ferrand, out of curiosity, took up the study of this animal. He placed the heads of vipers in 95 per cent alcohol, ground them up with chopped meat, and added ten times the weight

of physiological salt solution. The mixture was then filtered through a porcelain candle and put into ampoules. The product, when injected into the peritoneum of rabbits, produced an abundant evacuation of urine. When injected subcutaneously into healthy human beings the same result was obtained.

An article in the *Concours Médical* contains an account, by Professor Billard and his assistant, M. Barbes, of a young girl who had suppression of urine in scarlet fever, and was likely to die. She was given two subcutaneous injections of viper extract, which brought relief and the child recovered. Apparently, we have here a diuretic of great potency. It was precisely for this action that viper was employed by the old physicians.

First-Aid in Electrical Accidents

It cannot be too widely known that electric shock hardly ever causes death outright. Dr. D. Pometta, principal medical officer of the Swiss Accident Insurance Institute, has recently given a useful résumé (*Schweiz. med. Wchnschr.* 4: 82, 1930) of the various methods of treatment which will probably save the victim's life if applied promptly and patiently. Such measures should be as familiar as the first-aid treatment of the common forms of poisoning, and the practitioner living in a district where accidents of this kind are particularly likely to happen will do well to have his apparatus packed in a special case ready to take up at a moment's notice. He should put aside all other work to answer the call to an electrical accident immediately, and should be prepared to stay by the patient for several hours. As soon as the victim has been removed from the danger zone, his mouth should be freed from dirt and any other obstacle to respiration, such as artificial teeth, and clothing should be removed from the upper part of the body, preferably cut off to save time. He should be kept warm with blankets and hot-water bottles or heated bricks, but zealous assistants must be warned of the danger of causing burns. The face and chest may be splashed with water, the limbs and cardiac region may be massaged, and cardiac and respiratory stimulants such as lobeline may be given subcutaneously; but none of these secondary requirements must delay or interrupt artificial respiration—the essential treatment—for more than a few seconds. While pointing out that prompt and correct applica-

tion is more important than the choice of any special form of artificial respiration, Pometta prefers the Sylvester method. Here he is in a minority, for most authorities agree with Prof. S. Jellinek in recommending Schäfer's. He regards manual methods as better than mechanical, but says that apparatus may be useful to replace assistants when everyone is tired out. Carbon dioxide is a valuable respiratory stimulant, and can be given from a soda-water syphon when no cylinder is available. The syphon is half emptied and a rubber tube is attached to its nozzle; it is then inverted and the fluid is blown out of the glass tube. Gas is admitted to the patient's air passages through one nostril, while artificial respiration is maintained continuously. Unless the patient's other injuries are so severe that he cannot possibly be alive, respiration must be continued for at least five hours, and the absence of the sounds of the heart or respiration or of the corneal reflex are no indication that he is dead.—*The Lancet* 218: 310, 1930.

Hæmaturia from Inhaling Turpentine

A recent outbreak of hæmaturia on one of H.M. ships appears to have been due to inhalation of turpentine vapour by seamen engaged in painting in enclosed spaces. Surgeon-Commander H. Wilks reports that symptoms arose after one or two days' work, seven men reporting themselves sick within a week. The patients complained of scalding pain at the end of micturition, and, in some cases, of frequency; the urine contained blood and had the odour of violets associated with turpentine poisoning. The hæmaturia disappeared spontaneously and rapidly in hospital, and showed no signs of recurrence on return of the patients to work. The turpentine used was analyzed and was reported by the government analyst to be good and normal. To prevent further cases the parties of seamen engaged in painting were cut down and distributed at greater distances from each other, and orders were given for removal of paint from hands and faces before eating. No more cases arose after the parties had been thinned out. There is a possibility that the turpentine used was insufficiently mixed with the flattings, for the seaman responsible for this task was hard put to it to keep pace with the demands of the painters. The vapour of the turpentine was more quickly released than it was removed by the ventilation system.—*The Lancet* 218: 307, 1907.

Medico-Legal

Medical Fees at Inquests

By J. W. S. McCULLOUGH, M.D., D.P.H.,
Toronto

The *British Medical Journal* of August 9, 1930, contains the reserved judgment of an English County Court upon the claim made by a physician of £22, 11s. for examining seven bodies and giving evidence on two occasions in the case of the victims of the Croydon disaster. The decision in the case is of interest, affecting as it does the fees of medical witnesses where, as is usual, a single inquest is held in circumstances where two or more persons die as the result of the same accident. In the case under consideration the coroner held that as the cause of the seven deaths was dealt with at the one inquiry the medical witness was entitled to two fees of 1½ guineas, as if one inquest had been held on one body at two sittings.

Under the English Coroners' Act the medical fees are:—

"a.—For attending to give evidence at any inquest whereat no post-mortem examination has been made by the practitioner, 1½ guineas for each day of which he is required to attend; and

"b.—for making a post-mortem examination of the body of the deceased and reporting the result thereof to the coroner without attending to give evidence at an inquest, 2 guineas; and

"c.—For making a post-mortem of the body of the deceased (including the making of a report, if any, of

the result thereof to the coroner) and for attending to give evidence at an inquest on the body, 3 guineas for the first day and 1½ guineas for each subsequent day on which the practitioner is required to attend:

"Provided that no fee or remuneration shall be paid to a medical practitioner for the purpose of a post-mortem examination instituted without the previous direction of the coroner."

In the case in question the medical man made an examination of the seven bodies who were the victims of an air disaster and on the following day attended the inquiry. This was adjourned and the witness attended again at the resumed hearing. He contended that he was entitled to seven 1½ guinea fees for each of the two days he attended.

In giving judgment in favour of the medical witness His Honour said that "Although it was common practice for coroners to hold a single inquiry into the deaths of two or more persons, there were really in the law as many inquests as there were dead bodies touching whose deaths the inquiry was heard." Following this view he decided that there were in the case not one, but seven inquests and that the medical witness was entitled to his fees in each case.

It would be worth while for coroners and medical witnesses in this country carefully to examine the various Canadian Acts in order to see if they run parallel with the English Act in respect to the fees of medical witnesses.

ACAPNIA AS FACTOR IN POST-OPERATIVE SHOCK, ATELECTASIS AND PNEUMONIA.—Yandell Henderson states that the causal sequence leading to surgical shock (apart from hæmorrhage) and that leading through atelectasis to post-operative pneumonia are closely related. Both originate in acapnia, one through depression of the circulation, the other through depression of respiration. Acapnia, or deficiency of carbon dioxide in the blood and tissues, is a condition closely related to asphyxia, or deficiency of oxygen in the tissues. Either of these deficiencies disturbs the respiratory processes of the tissues, and each involves a considerable degree of the other. Experimentally, a slight degree of acapnia may be induced by over-ventilation of the lungs. A more intense form, capable of producing death by failure of respiration, may result from the excessive breathing in the first stage of badly administered anaesthesia. But in the most severe form of acapnia leading up to surgical shock, the deficiency of carbon dioxide, or decrease of alkali

bicarbonates in the blood, arises from a disturbance of the respiratory metabolism of the tissues analogous to asphyxia. Inhalation of carbon dioxide effects a restoration of the alkali bicarbonates and carbon dioxide content of the blood. The depression of the circulation after operation and anaesthesia (nonhæmorrhagic shock) is due to the lowered activity of the respiratory and other nerve centres that influence skeletal muscles. The result is an atonic condition of all the muscles of the body and a decrease of muscular pressure on the tissues which permits the blood to stagnate in the venules and decreases the venous return to the heart. If pathogenic organisms are present they find in the unaerated, undrained area conditions which favour their growth, and pneumonia may result. Inhalation of carbon dioxide by counter-acting acapnia and inducing deeper breathing inflates the lungs and prevents the development of atelectasis. It is thus a specific preventive of the post-operative pulmonary complications that lead to pneumonia.—*J. Am. M. Ass.* 94: Aug. 23, 1930.

Abstracts from Current Literature

MEDICINE

The Problem of Pulmonary Tuberculosis in Patients with Diabetes. Fitz, R., *Am. J. M. Sc.* 180: 192, 1930.

Fitz reports 35 cases of active pulmonary tuberculosis in 1,529 patients with diabetes, seen in the out-patient department of the Peter Bent Brigham Hospital during the past seven years. Of the 35 cases recognized during this time period, 30 are now dead—a mortality of 86 per cent. Nineteen cases, or 63 per cent. died within a year after the disease was recognized.

Pulmonary tuberculosis is particularly prone to develop in the elderly obese diabetic of poor circumstances, leading a sedentary life, who has lost weight rapidly through inadequate treatment. The disease commonly begins as a hilus infection, spreading outwards. For this reason the x-ray is a valuable adjunct to the ordinary routine examination. As a rule old reactivated lesions give the best prognosis.

The most satisfactory treatment is prophylaxis. Rapid reduction in body weight should be guarded against by insuring an adequate diet and insulin. The importance of fresh air and hygienic surroundings is emphasized. Most of the tuberculous patients were sent to sanatoria after a period of observation in the hospital. In most cases the tuberculosis advanced in spite of all therapy and the patient died. The tolerance to insulin was not affected by the disease. Clinics treating diabetics are urged to be on the *qui vive* for the disease. Unexplained loss of weight or any other untoward symptom in an adequately treated diabetic should arouse at once a suspicion of the onset of pulmonary tuberculosis.

E. S. MILLS

Psychogenic Factors in the Etiology of Ulcerative Colitis and Bloody Diarrhoea. Murray, C. D., *Am. J. M. Sc.* 180: 239, 1930.

Murray emphasizes the frequency and importance of emotional disturbances in cases of ulcerative colitis. He has studied the psychic life of a series of cases with a view to establishing a possible bearing upon this disease, and has shown how its course may be favourably influenced by proper psycho-analytical methods.

He points out that a state of emotion, *e.g.*, fear, is often accompanied by hypermotility or spasticity of the colon, and probably also by hypersecretion and vasomotor disturbances. A number of cases are cited as illustrations. An

only child notices the first shreds of mucus in her stools on the very day on which she becomes secretly married. Another case, unconsciously conditioned against marriage, finds blood in her stools soon after becoming interested in her first suitor. Later, when engaged to a second one, she develops severe diarrhoea with cramps and bloody stools a few days before the date originally set for her wedding. A third case, a boy of 18 with a past history showing association of diarrhoea with fear, notices blood in his stools after a fellow worker threatened to murder him. Murray therefore feels that the more severe cases of colitis with bloody diarrhoea and ulcerations have a psychogenic factor in their etiology, of a kind similar to that long recognized as existing in some simple diarrhoeas and in mucous colitis. A thorough investigation into the patient's life and mental attitude may afford opportunity for much-needed psycho-therapy in conjunction with the intensive local medical treatment of the colitis. The most difficult cases to treat are those in which the emotional conflict is deep-seated, chronic, or not easily settled; where there is a specific organism; and where the individual is predisposed in some way to colon infection by early training or by general physical or mental make-up.

E. S. MILLS

Allergic Migraine. Balyeat, R. M. and Brittain, F. L., *Am. J. M. Sc.* 180: 212, 1930.

Balyeat and Brittain draw attention to the similarity between migraine, asthma and hay fever, and emphasize the association of migraine with specific sensitization to one or more food proteins. It is recognized that migraine is frequently interchangeable with hay fever and asthma, occurring in various members of a family suffering from one or other of the allergic diseases. The exciting factor can invariably be recognized among the foreign proteins by means of skin tests. The predisposing factors are physical or mental fatigue, thyroid dysfunction, genito-sexual causes, toxic states, or disturbances of special senses.

As regards diagnosis, the authors lay particular emphasis upon the hereditary factor. If the family history of allergy is strong and the patient's headache and other symptoms somewhat atypical, the former should be allowed to outweigh the latter. On the other hand migraine should be diagnosed with caution, even when the symptomatology is

clear cut, if the family history is not suggestive.

The treatment consists in the recognition of the offending protein, and, if possible, its removal, along with any of the predisposing factors. In the experience of the authors, the common offending proteins were wheat, milk, fish, egg, bean, nut, and turnip. Positive reactions for these proteins occurred in from 36 to 70 per cent of the 55 cases studied. Out of this total, 29 (52.7 per cent) obtained almost complete freedom from symptoms by these methods. An additional 18 per cent obtained what is termed 60 per cent relief, a sufficient improvement to insure comfort and ability to work.

E. S. MILLS

The Treatment of Essential Hypertension.

Palmer, R. S., *New Eng. J. M.* 203: 208, 1930.

Forty per cent of heart disease is associated with arteriosclerosis and hypertension. Most investigators agree that 140 or 150 mm. of mercury is the upper limit of normal systolic pressure for men over 20 years of age and a somewhat lower pressure is normal for women. In later middle age the limit may be raised to 160. The normal pressure in old age tends to fall again.

Reduction of weight in the markedly obese by low caloric balanced diets is occasionally attended by brilliant results. Low protein and salt free diets appear to be ineffective. The chief factor in any regimen for the hypertensive person is nervous relaxation. The practitioners of physical therapy have not been inactive in this field; light baths, vibrations, autocondensation, colonic lavage, carbon dioxide baths, diathermy and warm tub baths have all been used. Almost unnumbered drugs have been proposed; bismuth subnitrate, mistle toe, atropin, euphillin, theobromine, luminal, iodide, the sulpho-cyanates, garlic, and, recently, watermelon seed have been recommended. Symptoms are more affected than blood pressure, and the nervous, variable, and climacteric types are most helped. The author found that potassium sulphocyanate worked well in about 40 per cent of cases.

A presumably effective preparation of the female sex hormone (standardized in 25 rat units per c.c.) was given intramuscularly for five or six weeks to one patient, without influence on the blood pressure, but with notable subjective improvement. One patient was treated with potassium iodide theocalcin and apparently improved, both objectively and subjectively.

The astonishing number of favourable reports on the use of a large variety of drugs and other forms of treatment in hypertension is an indication that more rigid criteria for the

clinical evidence of a hypotensive effect must be met. It is suggested that the following might be useful in the clinical estimation of the hypotensive action of any given therapeutic measure:—

1. Each observation shall consist of at least ten successive determinations of systolic and diastolic pressure at one minute intervals, the same type of instrument to be used at each observation, and the patient to be in the same position.
- (2) It appears advisable that this type of investigation be carried out on ambulatory patients, exposed to the daily nervous excitements which the unhospitalized person must meet.
- (3) Two or more weekly observations shall be made before starting treatment.
- (4) A fall in the average of the ten readings at successive visits should be demonstrable after a period allowed for the full effect of the treatment, and this effect should be maintained at two or more further observations. The patient should be under treatment from four to six weeks.
- (5) The treatment should then be omitted and a rise in blood pressure shown after ample time has been allowed for the effect of the procedure to have abated.
- (6) Finally a second hypotensive effect of the treatment should again be demonstrable.

LILLIAN A. CHASE

New Features in Clinical Teaching. Pratt, J. H., *New Eng. J. M.* 203: 1, 1930.

Only of late has it been realized that if the senior student is to recognize the early signs and symptoms of disease he must do careful work in the out-patient department. This cannot be done when large numbers of patients flock to the clinic where only a few doctors are in attendance. In the Boston Dispensary, during the past two years, 10 to 15 physicians have been in daily attendance at the medical clinic, the average number of patients seen has been 45. The wise policy prevails of giving financial return in some form to the graduate assistants who are working daily in the medical clinic.

The daily clinical conference, lasting one hour, held at 8.55 a.m. in a well-appointed room, has proved to be most instructive and unifying. The program consists of case presentations, criticisms of case records, talks by people especially interested in a certain phase of the work, talks by the social service workers in order to give some insight into the social and economic factors that often are so important in the production of disease. A small reference library is in the assembly room.

Six students are assigned to the medical clinic where they spend the entire day. Each works with a single physician on the staff for a month. At 2 p.m. the six clinical clerks assemble in the conference room and an in-

formal lecture with demonstrations is given for an hour by one of the staff; a different physician gives these talks each day of the week. Such subjects as the psychoneuroses, the determination of the basal metabolic rate, the interpretation of the electrocardiogram, renal function tests, the newer methods of blood examination, physical signs in diseases of the lungs, the diagnosis of gastro-intestinal diseases, and the making and interpretations of orthodiagrams of the heart are dealt with. From three to five p.m. the members of the class work in clinical pathology or work in the observation ward. One afternoon the students are required to prepare diets for diabetic and obesity patients under direction of the dietitian.

The care of the sick poor in their homes has been carried on by the Dispensary since its organization in 1796, but home visitations have never been utilized to any extent in the instruction of students until the fall of 1928. After the morning conference the students visit patients reported as acutely ill in different parts of the city. The call is unhurried and the student has an opportunity to study the sick one and his illness in the natural environment of his home. In the afternoon he returns with the district physician who acts as a consultant. Tufts Medical College is actually giving to its students some training under the same conditions that confront the family doctor. It is conceded that of all patients that come to the general practitioner less than 10 per cent require hospital care, yet in the past the only bed cases studied by the medical student have been in hospital wards.

It was once a familiar sight in Massachusetts towns to see a doctor accompanied on his rounds by one or more students. Once more, after a lapse of one hundred and fifty years, doctors with their students can be seen in Boston streets going in and out of the homes of the sick poor.

LILLIAN A. CHASE

SURGERY

Internal Hæmorrhoids Injection Treatment.

Hayden, E. P., *New Eng. J. M.* 203: 218, July 1930.

Injection treatment should be confined entirely to internal hæmorrhoids. It should not be undertaken in the presence of a chronic fissure, fistula, or any perianal infection. The solutions employed are all irritating; their use produces either thrombosis or perivascular aseptic inflammation. As external hæmorrhoids produce symptoms only when thrombosis or inflammation exists, it is obvious that injection has no place in the treatment of the external variety. Caution must be used in the treatment of internal piles which are visibly continuous with the external perianal veins. The author uses

5 to 10 per cent quinine and urea hydrochloride in water. It is better not to inject more than two vessels the first time. It requires from three to eight injections into a hæmorrhoid of any size to produce fibrosis sufficient for a permanent cure. Injection in a particular pile should not be given oftener than once a week. The treatment is entirely ambulatory.

This method possesses the following advantages. No hospitalization is required. No loss of time from business is necessary. It is essentially painless. No strictures result. Post-operative hæmorrhage is rare. Post-operative catheterization is unknown. Skin tabs do not result. There is no mortality.

LILLIAN A. CHASE

Thyroglossal Cysts and Sinuses. Clute, H. M., and Cattell, R. B., *Ann. of Surg.* 92: 57, 1930.

The commonest abnormalities arising in the thyroglossal tract are simple cysts and sinuses. Simple cysts are retention cysts; sinuses are the result of (1) spontaneous rupture of a cyst, due to inflammation, or (2) surgical drainage. A true congenital fistula opening into the base of the tongue may occur.

Thyroglossal abnormalities occur in females slightly more frequently than in males. The average age reported in this group was 33. Thirteen per cent of these cases were noticed before 10 years of age. Infection of a cyst may result in osteomyelitis of the hyoid bone, the consequent sinus leading to the erroneous belief that all of the tract has not been excised.

Cysts are usually located in the midline of the neck on the thyro-hyoid membrane in the sub-hyoid area, and move upward with deglutition. Increase in size may result in asymmetrical position. Occasionally a cyst may be so low as to be confused with an adenoma of the thyroid. Symptoms are always entirely due to infection. In thyroglossal fistulas periodic discharge of mucopurulent material into the mouth occurs.

Operative treatment consists in removal of the cyst or sinus, resection of the median part of the hyoid bone, and excision of a core of muscular tissue in the plane of the tract, up to the foramen cæcum. In the presence of infection in a cyst, drainage only should be done. In the author's series of cases there was no operative mortality, and no recurrence in 51 followed cases. Operation is advised for unsightliness, discharging of sinus, or infection.

S. D. GORDON

Horse-Shoe Kidney. Jacobs, A., *Brit. M. J.* 2: 8, July 5, 1930.

Horse-shoe kidney is one of the commonest of renal abnormalities. The condition results from fusion of the upper or lower poles of the two kidneys across the mid-line, the latter being

most common. Connective tissue or renal parenchyma forms the isthmus, which usually lies anterior to the aorta and vena cava. Two ureters are the rule and arrive from separate pelves. The ureters pass anterior to the isthmus and this is given as the reason for the greater disposition of the horse-shoe kidney to tuberculosis, hydronephrosis, calculi, etc.

Symptoms usually depend on pathological change in the kidney. Diagnosis is most accurately arrived at by pyelography, where it is noted that the ureters pass from the lateral or anterior aspect of the pelvis. The kidney is best approached retroperitoneally. Two cases, successfully treated, are reported by the author.

S. D. GORDON

Ramisection in Cases of Spastic Weakness.

Symonds, C. P., and others, *The Lancet* 219: 127, July 19, 1930.

This short article is a review of six cases in which a ramisection was performed by Mr. Royle in England in 1927. They were cases selected by Mr. Royle, afflicted with spastic weakness, which he considered to be benefited by ramisection. The review of these cases three years later by ten selected doctors show that none have been improved.

The conclusion is that the operation of cervical or lumbar ramisection as performed by Mr. Royle is without effect upon the rigidity from extra-pyramidal disease. The observations recorded show that in young human beings the sympathetic fibres play no rôle of any importance in the maintenance of muscular rigidity, whether this is of the so called Parkinsonian variety or of the type seen in lesions of the pyramidal tracts.

W. L. GRAHAM

Treatment of Bronchiectasis, Multiple Stage Lobectomy. Coryllos, P. N., *Arch. Surg.* 20: 767, May 1930.

Through the extensive use of iodized oil in making roentgenographic examinations for chronic pulmonary suppurations it has been found that bronchiectasis is a common pulmonary disease. Coryllos classifies the clinical forms of bronchiectasis as:—(1) The bronchitic form, where only roentgenograms taken following the injection of iodized oil reveal the disease. None of the classic symptoms of bronchiectasis is present; the bronchial lesions are slight and the parenchyma of the lung is healthy. (2) Early uncomplicated bronchiectasis in which bronchial lesions are definitely present but are still limited to the bronchi. No pneumonitis is found in plain roentgenograms. Cylindrical or sacular dilatations of the bronchi are seen; clubbing of the fingers is present, but there is no foul sputum or loss of weight. The lesion is generally unilateral. (3) Complicated bronchiectasis, with more or less advanced pneumonitis, or even small multiple bronchiectatic abscesses,

corresponding to the classic form of bronchiectasis. Foul sputum, persistent cough, a more or less septic appearance, intermittent fever, loss of weight and markedly clubbed fingers are present. (4) Bronchiectatic abscesses, unilobar, unilateral, or diffuse, according to the distribution of the disease.

Besides these forms which depend on the pathology of the disease, one must distinguish clinical forms according to the age of the patient and according to the evolution of the lesions.

In the general treatment of the bronchitic form, a careful examination and treatment of the paranasal sinuses associated with hygienic measures, a hot dry climate, and postural and bronchoscopic drainage will in a number of cases check the progress of the disease. In the second form, besides these measures, a therapeutic compression of the lung should be considered; the parenchyma of the lung is still compressible and collapsible. Pneumothorax, phrenicotomy, or even thoracoplasty, associated with postural and bronchoscopic drainage of the bronchi and antispasmodic treatment, when necessary, have often given satisfactory results. These suggestions apply especially to cases of unilateral bronchiectasis. In the third form, the advanced with pneumonitis and multiple bronchiectatic abscesses, if the general condition of the patient permits there is but one curative treatment and this is the surgical exeresis of the diseased portion of the lung by lobectomy, cautery pneumectomy, or exteriorization and ligation of the involved parenchyma of the lung.

The causes of death following lobectomy may be: (1) shock, cardiac failure or pleural shock; (2) embolism (air or septic); (3) hæmorrhage during and after operation; (4) increased intrapleural pressure from pneumothorax or intrapleural fluid; (5) septic pleurisy; (6) septic mediastinitis.

Coryllos describes how lobectomy may become a safer operation in his opinion in the systematic carrying out of pneumothorax, phrenicotomy, thoracoplasty and lobectomy that is by graded operation. He recounts the histories of two cases of advanced bronchiectasis in whom cure was obtained by the technique which he outlines.

G. E. LEARMONTH

Recurrent and So-called Metastatic Giant Cell Tumour. Geschieter, C. F., and Copeland, M. M., *Arch. Surg.* 20: 713, May 1930.

In a previous contribution (*Arch. Surg.* 19: 169, Aug. 1929) these authors advanced the view that, giant-cell tumours and bone-cysts constitute a single entity, and that the giant-cell tumour arises as an abnormal phase in the resorption of temporary bone, in response to trauma, while the bone-cyst presents the healing phase of the same lesion. Further evidence is presented in the present paper concerning a certain group of these lesions to differentiate them more clearly from the bone sarcomas. Clinical recurrences are frequent after treatment in typical giant-cell

tumours which show the progressive nature of this disease. Among 222 cases of giant-cell tumours at the Johns Hopkins Hospital there were 31 recurrent cases. In three additional instances metastases to the lungs were supposed to have caused the deaths of the patients.

For purposes of analysis these tumours have been classified into four different groups: (1) The benign cell tumour with features leading to recurrence; (2) malignant variants which resemble sarcoma microscopically, with or without clinical recurrence; (3) giant-cell tumours associated with metastases and death; (4) osteogenic sarcoma containing giant cells, and resembling, microscopically, the giant-cell tumour. The authors cite cases typifying each group.

The metastatic group is of especial interest, since, recently, various investigators have attempted to show that the typical giant-cell tumour called "benign" may occasionally metastasize and produce death. The authors have gathered eight such cases from the literature and from the records of the surgical laboratory of the Johns Hopkins Hospital, as well as reports of cases and sections from various clinics in New York, Philadelphia, Chicago, Baltimore, Canada, and England bringing the series to well over 500 cases. In a study made of these cases there are two important conclusions; first in no case has a nodule of typical giant-cell tumour ever been found in the lung, for wherever these metastatic nodules have been examined they have shown the histology of osteogenic sarcoma; secondly, in no case has the association of an originally benign and typical giant-cell tumour in the bone with a secondary metastatic osteogenic sarcoma in the lung been proved.

In the fourth class, the osteogenic sarcoma with giant cells, the authors recognize two well defined groups, namely, the chondroblastic and the fibroblastic series. The former gives rise to a more malignant and rapidly growing form of osteogenic sarcoma, while the latter has a longer average clinical course and a higher percentage of five-year cures. In the treatment of the 214 cases of giant-cell tumour forming the basis of this study amputation was the primary operation in 30 cases, resection in 34 cases, and primary curettement in 105 cases. Primary Roentgen ray treatment without operation was employed in 5 cases.

G. E. LEARMONTH

OBSTETRICS AND GYNÆCOLOGY

The Old Multipara. Robinson, A. L., *Brit. M. J.* 3627: 47, July 12, 1930.

Clinical reports of all maternity hospitals show the mortality risk for a woman of 40 to be three times as great as that of a primigravida of 18. From Menzies' tables as to the effect of age upon puerperal mortality three generalizations emerge:—(1) there is a special risk attached to the first labour, whatever the age of the patient; (2) there is a special risk attached to age, whatever the

parity of the patient; (3) increasing parity is associated with a diminishing risk up to the fourth labour, and after that with an enhanced risk that increases with each successive pregnancy.

Parity brings with it certain changes that gradually increase the risk of childbirth—namely, calcium depletion, loss of muscle tone and a tendency to hæmorrhage. Decalcification of the pelvic bones may cause a shrinkage in the bony birth canal. A table of craniotomy cases indicates a peculiar form of dystocia in the higher degrees of parity. The difficulty is essentially due to the combination of two factors—the first, a minor mechanical obstacle to delivery, the second, a defective musculature. Loss of tone in the uterine muscle is responsible for inertia, prolonged labour, and post-partum hæmorrhage, and it also produces a flaccidity of the walls of the uterus that destroys and distorts the shape of this organ. In most women of advancing years there are definite changes in the myocardium, kidney, and uterus. The general result of the whole process is to lower the resistance of the patient, to reduce her capacity for work, and to render her more sensitive to fatigue and shock.

Four, or perhaps five, children should be regarded as an ideal number, but further reproduction should be discouraged on account of the increased risk that attaches to the higher degrees of parity. Some of the deleterious effects of age and parity can be counteracted by improving conditions of the community with regard to food, wages, and housing. Ante-natal care is urgently required, but it can never replace the need for skilful attendance during labour itself; much more attention should be devoted to the post-natal period and the processes of involution and lactation. The exhibition of iron and calcium combined with a suitable aperient has a most favourable effect on muscle tone, and it may usefully be combined with 0.5 c.cm. of pituitrin twice a day during the last week or so of pregnancy; this not only improves the tone of the uterus, but in many cases brings labour on. Malpresentations must be corrected by manipulation or the application of padded binders. The induction of premature labour before or at term is a useful prophylactic measure for women who habitually produce big children.

During labour application of the forceps, or version in certain cases, will reduce the work of the myocardium and relieve the efforts of the uterus, and the third stage must always be conducted with the greatest possible care. It may require a certain amount of moral courage to suggest operative delivery to a woman who has already been delivered many times *per vias naturales*, but a careful review of the situation will show the wisdom of such advice for carefully chosen cases. It is safe to predict that in a more advanced epoch the majority of 8 paræ and all women of 40 will be delivered by Caesarean section.

ROSS MITCHELL

Post Menopausal Hæmorrhage. Herd, S. B., *J. of Obs. & Gyn. of the Brit. Emp.* 37: 304, 1930.

The author analyzes the causes of bleeding, occurring in one hundred women after at least 6 months amenorrhœa. In some the flow was profuse, while in others it was a mere blood-stained discharge. The cases seem to fall under two headings—first, those with gross physical signs, such as carcinoma of the cervix, polypus, fibromyoma, ovarian tumour or prolapse with ulceration, and secondly those without definite physical signs.

The former group, which presents little trouble in diagnosis, constitutes about 80 per cent of the total. The importance of a careful exploration of the uterus in the second group with sound and curette, followed by microscopic examination of the curettings, is stressed. In no case where hysterectomy was done subsequently had the curette been responsible for spread of the neoplasm to the ovary.

Post-menopausal bleeding should always be considered seriously, since in 61 per cent of the cases the cause is malignancy.

ELEANOR PERCIVAL

Primary Carcinoma of the Fallopian Tubes.

Watkins, R. E. and Wilson, W. M., *Surg., Gyn. & Obs.* 51: 125, 1930.

Carcinoma of the Fallopian tube is a very rare condition, only 200 authentic cases being on record. The etiology of the condition is obscure, some authors considering previous salpingitis as a predisposing factor, but this seems doubtful. Microscopically, the tube presents the appearance of chronic inflammation, being enlarged to form a retort-shaped mass. The growth spreads either by metastasis to the retroperitoneal lymph nodes or by direct extension to the ovaries. In one-third of the reported cases both tubes are involved.

The symptoms are not characteristic, a straw-coloured watery discharge, and metrorrhagia being most common, and only in a few cases is the diagnosis made before operation.

The best treatment is complete removal of all the pelvic organs, followed by deep x-ray therapy. The prognosis is poor.

ELEANOR PERCIVAL

Infection by Anaerobic Streptococci in Puerperal Fever. Colebrook, L., *Brit. M. J.* 3629: 134, July 26, 1930.

Anaerobic streptococci were first cultivated from the blood in puerperal fever in 1910 by H. Schottmüller. The further experience of twenty years has served to strengthen Schottmüller's belief that these anaerobic streptococci are at least as important as the hæmolytic variety in the causation of puerperal infections. Since October, 1928, Colebrook has isolated anaerobic streptococci from the blood of 17 puerperal fever patients. In 8 of the 17 cases the blood culture

gave a mixed growth—of two types of anaerobic streptococci with other species. The incidence of these 17 cases has not been such as to suggest a contagious origin of the infection. Ten of them had required intrauterine manipulations during labour. Seven of the 17 patients died (mortality 39 per cent). Septic thrombophlebitis was found post mortem in 4 cases and infarction in 2 others. Suppuration occurred during life, or was found post mortem, in 9 cases, anaerobic streptococci being always recovered from the pus. Anæmia was a striking and progressive feature in the prolonged cases. Thirteen of the 17 cases of generalized infection by anaerobic streptococci have occurred at Queen Charlotte's Hospital. During the same period there have been only 6 cases of septicæmia (possibly 7) due to hæmolytic streptococci at this hospital (3 fatal).

The nineteen strains of anaerobic streptococci isolated from the blood of patients appear to form a heterogeneous group. Some of them conform to the *S. putridus* type described by Schottmüller, while others do not.

The technique of the blood culture which has proved suitable for the isolation of anaerobic streptococci is described. The view is expressed that puerperal infection by anaerobic streptococci occurs much more frequently in England than has been recognized; and that failure to detect the generalized infections has resulted from the use of unsuitable blood culture methods.

ROSS MITCHELL

Die intravenöse Injektion von Hypophysenhinterlappenhormon zur Diagnose der Frühgravidität. (The intravenous Injection of the Hormone of the posterior lobe of the Pituitary in the Diagnosis of early Pregnancy). Küstner, H., *Deutsche med. Wchnschr.* 56: 384, March 1930.

The author has employed a procedure in connection with the diagnosis of early pregnancy (extrauterine gestation etc.) which has, in his hands, proved to be of definite value in the differential diagnosis of gynecological conditions. This is the intravenous injection of about 1½ Vögtlin-units of the hormone from the posterior lobe of the hypophysis, that is, about 0.5 c.c. of the usual solution of hypophysin or pituglandol. About one-half to three-quarters of a minute after the injection the uterus assumes a stony hardness, and the contraction lasts from three to five minutes. This strong contraction of the uterine muscle has been noticed in the pregnant and puerperal periods only. It is not found in myomatous degeneration of the uterine muscle, in enlargement of the uterus from mucous polyps, or in the presence of submucous myomata. This method has now been tried in a considerable number of cases and has given valuable service in complicated cases and where examination is difficult. For example, it is of value in the differential diagnosis between retroflexion of the gravid uterus and retrouterine hæmatocele. The

injection of the hormone and the consequent strong contraction of the uterus exerts no harmful influence on the progress of the gestation.

A. G. NICHOLLS

PÆDIATRICS

Croup: An Analysis of Three Hundred and Forty-Four Cases. Tolle, D. M., *Am. J. Dis. Child.* 39: 5, May 1930.

This important paper makes a definite contribution to our knowledge of croup. The author analyses the clinical laryngoscopic, and bacteriological findings in 344 cases of croup treated by her at the Willard Parker Hospital in a single year. The routine procedure on admission included direct laryngoscopic examination, the taking of cultures from the nose, throat and larynx, and the usual physical examination.

Two hundred and twelve of the croup cases, or 61 per cent, were found to be diphtheria. The youngest patient was five months of age and the oldest 21 years. Over half the cases occurred in the first four months of the year, and 60 per cent occurred in the first three years of life. In 23 per cent the membrane was confined to the larynx, the nose and pharynx being clear. Early cases showed a thin adherent membrane, with considerable injection and swelling of the laryngeal mucosa. With increasing age the membrane became thicker and more detachable and the laryngeal swelling subsided, until (in cases seen about the fourth day) the membrane was thick, often partially detached, and the larynx practically free from swelling. The membrane was white or yellowish white, sometimes patchy in distribution, sometimes lining the larynx, and in twelve per cent of the cases extended into the trachea and bronchi.

Treatment consisted of the intravenous administration of antitoxin, removal of the membrane from the larynx (and trachea) by suction, with the employment of intubation only as a last resort. Tolle observed that in two to two and a half days after intravenous injection of antitoxin the membrane ceases to form again after removal; this clearing of the larynx is delayed twenty-four hours of the antitoxin is given intramuscularly rather than intravenously. Twenty-four hours saved means fewer suction, fewer intubations, less danger of bronchopneumonia, more rest for the patient, and consequently a lower mortality.

Suction (with a metal tube and a motor-driven pump) was routinely employed whenever the laryngoscopic examination showed membrane; it was repeated whenever urgent dyspnoea indicated. One suction was usually sufficient; the greatest number of times it was used in any one case was eight. The advantages of suction were: relief from dyspnoea, the child often falling asleep before he was taken from the table; fewer intubations; lowered incidence of bronchopneumonia; lower mortality; practically no "blocked tubes" in the cases that afterwards come to intubation.

On the other hand, early cases (with very thin adherent membrane), tracheobronchial cases and those with much laryngeal oedema were not usually improved by suction.

With the use of suction, only 20 per cent of the patients required intubation. The mortality among these intubated patients was 16 per cent, as contrasted against 41 per cent in a former series where intubation was resorted to twice as frequently. In tracheobronchial diphtheria, the death rate was 58 per cent in this series, as contrasted against a rate of 96 per cent in a series reported by Welford where no suction was used. The average length of time a tube was worn was 4.2 days. Four weeks was taken as the extreme length of time that a tube might be worn before rest was given to the larynx by tracheotomy; one child in this series came to tracheotomy and eventually, following laryngeal boudinage, her tracheotomy tube was discarded.

The mortality rate in the 212 cases was 12.7 per cent. Of the 27 deaths, 17 were cases of tracheobronchial diphtheria. The author believes that suction, used skilfully and judiciously, by an operator who is able to perform intubation or tracheotomy if need arise, materially lessens the mortality in laryngeal diphtheria.

One hundred and four patients in the series had simple catarrhal laryngitis, with moderate inflammation, swelling, and occasionally a slight exudate on laryngoscopic examination. In most cases the laryngeal culture showed one or other of the streptococci. The only deaths were due to a complicating bronchopneumonia. Suction was not necessary in these cases. Acute laryngotracheobronchitis, however, with toxicity, cyanosis or pallor, and retraction of the thorax, produced a mortality of 50 per cent in the 22 cases. A hæmolytic streptococcus was the organism most frequently found in the culture from the larynx. Marked oedema of the subglottic regions and plugs of dried mucus, with occasionally a loosely attached exudate, were the laryngoscopic findings. Suction was used on all; in eleven cases suction alone, in nine cases intubation was necessary in addition to suction, and two cases went on tracheotomy. The mortality was lowest in the group treated by intubation after previous suction.

Foreign bodies in the larynx and in the trachea, and polyps in the larynx were the etiological factors in three other cases with symptoms of croup.

A. K. GEDDES.

Thymic Shadows in New-Born Infants. Podlasky, H. B., and Kohn, S. E., *Am. J. Dis. Child.* 39: 4, April 1930.

For purposes of this study a thymic shadow on the roentgenogram was interpreted as "enlarged" when its width at the level of the second thoracic vertebra exceeded twice the transverse diameter of that vertebra. The technique was standardized, but the respiratory phase during which the exposure was made could not be kept a constant

factor. Roentgenograms of the chest of 100 consecutive infants in the first twenty-four hours of life showed 35 with wide thymic shadows. None of the symptoms usually referable to thymic enlargement was evident in any of these cases. All were discharged from the maternity ward at the usual time in good condition.

A. K. GEDDES.

Underweight Children: Increased Growth Secured Through the Use of Wheat Germ.

Morgan, A. F., and Barry, M. M., *Am. J. Dis. Child.* 39: 5, May 1930.

The recent discovery of the multiple nature of vitamin B, formerly considered to be present in adequate amounts in any rational diet, has led to new assays of the common foodstuffs for their content of the relatively thermolabile antineuritic vitamin B and the antipellagric vitamin G. The antineuritic substance vitamin B has been shown to be relatively abundant in cereals, particularly in the germ, and scarce in milk, meat, fruits and vegetables, whereas the antipellagric vitamin G is widely distributed in milk, meat, fruits and vegetables but scarce in cereals. The authors quote statistics to demonstrate the marked downward trend in the use of cereals in America and the corresponding upward swing of sugar consumption. The loss of protein and vitamin involved in the substitution of sugar for cereals cannot be compensated by the supposed (and unproven) increase in the use of fruits and vegetables. The vitamin B loss is, moreover, enhanced by the increasing use of highly milled products at the expense of whole grain cereals. Thus there is clearly seen a decreasing vitamin B content in the modern diet. To this vitamin B deficiency various workers, among them McCarrison, Hoobler, and Dennett, have ascribed the modern prevalence of constipation, anorexia in childhood, and nervousness in childhood.

The retention of vitamin B in cereals is not economically feasible, since the presence of the wheat germ (which contains practically all the specific vitamin of the grain) destroys the keeping properties of the flour. Artificial addition of wheat germ by the baker is by far the most effective method, since vitamin B can thus be supplied in much greater proportions than it is found in whole wheat.

To determine the effect of the addition of the antineuritic vitamin to the diet of school children, two groups of underweight children from 11 to 13 years of age were compared as to growth in weight, height and certain other physical measurements over three periods totalling thirty weeks. Each child in one of these groups in each period was required to include in the (supervised) noon meal three ounces of rolls made with 50 per cent wheat germ and 50 per cent white flour. The control group took the usual white rolls, while the experimental group ingested 5 ounces of wheat germ per week in their equally palatable rolls. The weight increments in each of the wheat germ periods were about three times as

great as in the control periods. The difference was five or more times greater than the probable error of the difference. The increases in height were greater in two of the wheat germ periods than in the corresponding control groups.

The authors conclude that the modern diet, particularly of children, should be fortified by the inclusion of vitamin B and that the most practical method of accomplishing this is the inclusion of bran-free sterilized wheat germ in all flour products.

A. K. GEDDES.

UROLOGY

Enlarged Prostate and Prostatectomy. Thomson-Walker, Sir John, *The Lancet*, May 31, June 7 and 14, 1930.

Thomson-Walker publishes an article in three parts on the above subject. The gradual development of therapy as related to the prostate is dealt with in his first lecture.

The second paper is concerned with the selection of cases for operation. He considers then under three headings.—(1) the prostate; (2) the urinary organs; and (3) the general condition of the patient. Under the first heading he describes the fibrous prostate as one of normal size, that is of 18 to 20 grams in weight, normal in consistency but causing urinary obstruction. Out of 44 cases of this type of which he has had, 18 were malignant, and 7 contained small calculi. Enucleation is usually difficult in these cases. The other type of fibrous prostate, that might be considered here, is the ordinary hypertrophy which has had x-ray treatment and the resulting fibrosis rendering it of a like nature.

He distinguishes malignant growth of the prostate as primary and secondary. The primary is malignant from the outset whereas the secondary has malignant changes engrafted on a simple hypertrophy. The proportion of primary malignant prostates to simple prostates is as one to six. In secondary malignancy the growth may develop in one of three localities; first at the base of the prostate near the internal meatus, secondly at the periphery of the enlarged gland, thirdly in the substance of the enlarged type. In 521 cases of removal by suprapubic prostatectomy 96 were discovered to be malignant by the pathologist. Of the 66 cases traced for a sufficiently long time there were only two, i.e. 3 per cent in which the malignant growth recurred. Urinary complications were discussed under the headings of renal inefficiency and sepsis. The greatest faith is put in the activity of nitrogenous excretion, as measured by the urea-concentration test. If the urea-concentration test is 2 per cent or over the case is a good risk. The lower the concentration test the more serious the risk. In a range from 1 to 1.5 per cent the mortality was 12 per cent. In those over 2 per cent the mortality rate was nil. This test is much more accurate than the estimation of the urea content of the blood.

Sepsis may occur before, during, or after the operation. Those cases present before the operation are discussed at some length, and so long as the infection was limited to the bladder, the only untoward sign was an epididymitis. These cases can frequently be cleaned up by a few weeks of bladder irrigations and the removal of residual urine. If the infection is of long standing a suprapubic cystotomy will be necessary. If pyelitis and pyelonephritis are present the general condition will gradually improve with bladder drainage. Thomson-Walker believes that the estimation of the cholesterol content of the blood will later play a definite part in the estimation of immunity. The normal content of the blood is 0.19 and 0.13 per cent. In 18 cases in which it was below 0.13 per cent, 16 died of pyelonephritis after prostatectomy, and two recovered. In Thomson-Walker's own series, having a cholesterol content below 0.13 per cent, 40 per cent died from the effects of sepsis.

Considering the general condition of the patient a large number of these patients have a low blood pressure. In the type showing low blood pressure there was a greater difficulty experienced from hæmorrhage, also a higher incidence of thrombosis and sepsis. In 19 cases with blood pressure below 120 there were three cases of thrombosis of the pelvic or cerebral veins and two cases of pulmonary embolism, that is 26 per cent, while in 88 cases with a pressure above 120 there were only two cases of thrombosis and only one died of sudden cardiac failure.

Mental and nervous diseases may occur following operation due to the lack of sleep and exhaustion. Diseases of the spinal cord, such as tabes dorsalis sometimes lead to difficulty in diagnosis. The diagnosis between prostatic obstruction and nerve atony of the bladder in tabes dorsalis will rest upon the following points:—absence of or diminished desire for micturition; impairment of sensation in the prostatic urethra spasmodic contraction of the compressor urethrae relaxation of the internal meatus from atony of the internal sphincter seen by cystoscope and urethroscope; fine trabeculation and sacculation of the bladder wall on cystoscopy; general sacculation of the bladder wall and funnel-shaped bladder neck and prostatic urethra on cystoscopy.

In deciding the time for the operation there is no question, in the majority of cases, but where the prostate is moderately enlarged, the symptoms are not disabling and where the residual urine does not exceed two ounces and is sterile the problem is more difficult. This state of affairs may last for five or six years but will eventually, due to some accident, cause retention and in the mean time the patient is growing older. However the operation can be successfully performed in extreme old age.

The arguments in favour of early operations are:—the increasing age of the patient; a chronic urinary retention; the danger of sepsis; malignant changes.

Drainage of the bladder, as a preliminary to prostatectomy should be done in, chronic retention with symptoms of renal inefficiency; severe urinary sepsis; serious extra-urinary complications. In the fourth group, in cases without serious back pressure or sepsis of extra urinary complications the question of doing the one or two-stage operation is debated. Thomson-Walker is in favour of the one-stage operation.

Lecture three deals with a description of the operation by Freyer's method and by the author's. Credit is also given to Judd for an operation closely resembling his own. In the post-operative care the foot of the bed is raised eighteen inches and the patient is carefully watched for shock. If the bleeding results in large clots or affects the general condition of the patient the prostatic cavity is packed under a light gas oxygen anaesthesia. The prostatic cavity is irrigated with a 1-20,000 solution of silver nitrate. Iodoform gauze is used for the packing. In uncomplicated cases either daily irrigations or continuous irrigations are carried out through a Hamilton Irving suprapubic box. A 1-20,000 silver nitrate solution is used and the box contains crystals of boric acid. Castor oil is given on the third day. Enemas are forbidden. The tubes are removed on the fourth day. A small tube is left in the bladder for another two days and then removed. In the usual routine the catheter is removed on the seventh day. The author does not use the Hagner or Pilcher bag.

In the final stage of a two-stage operation the open operation is not a satisfactory one. If an open operation is attempted under these conditions the bladder must be dissected free from the abdominal wall and from the pubic bones, and the scar tissue in the bladder wall surrounding the fistulous opening must be excised. Even then the bladder, contracted because of infection, renders exposure far from perfect. In the secondary prostatectomy Freyer's technique is more suitable. In prostatectomy, for a fibrous prostate, the operation is performed by dissection and is satisfactory. There is more tendency to bleed following this procedure and the prostatic bed is packed in addition to the hæmostatic suture.

Statistics from eleven of the great hospitals show that in 3,451 suprapubic prostatectomies there was a mortality rate of 19.5 per cent. At St. Peter's Hospital which is restricted to urological cases, in 29 years there were 2,691 cases with a mortality of 9.9 per cent. In private practice Thomson-Walker's mortality was 6.08 per cent. As remarked before, he does not believe that there is any benefit in doing a two-stage operation as a routine.

Failure in obtaining good results in prostatectomy is due to: (1) fibrous contraction at the site of the operation; (2) new growth in the wall of the prostatic bed due to, (a) recurrence of simple enlargement of the prostate, (b) malignant growths.

The causes are either an imperfect removal of

obstruction or sepsis. The methods of treatment of these conditions are discussed.

W. L. GRAHAM

NEUROLOGY AND PSYCHIATRY

Influenzal Encephalitis. Greenfield, J. G., *J. of Path. & Bacteriol.* 33: 453, April 1930.

The author reports two cases of acute disseminated encephalomyelitis following influenza, one fatal five days after onset, the other succumbing after seven weeks.

In the first case, neurological disturbances appeared 3 weeks after an attack of influenzal broncho-pneumonia, consisting of retention of urine, paralysis from the fourth intercostal muscle downward, complete abolition of thermal and pain sensibilities in the same area, with less interference with "touch" and "pressure". The cerebrospinal fluid was under normal pressure; contained 29 mononuclear cells per c.c. and 90 mgm. protein per 100 c.c.; globulin increased; the Wassermann test was negative. Microscopic examination of sections from cord and brain showed areas of perivascular demyelination, especially abundant in the cord from the sixth cervical segment downward. The blood vessels were greatly congested and in places there was intense perivascular infiltration with round cells.

In the second case, the onset followed abruptly on the onset of influenza. The symptoms were severe pain in the forehead and back of neck, soon followed by paraplegia, retention, and severe interference with sensation in the lower limbs. The cerebrospinal fluid contained 17 mononuclear cells per c.c.; 60 mgm. protein per 100 c.c.; the Wassermann test was negative. The microscopic findings were essentially the same as in case No. 1.

The author points out the striking resemblance between the lesions found in these cases and those found in fatal cases of encephalitis associated with vaccination, smallpox and measles. After discussing the presently extant theories of the etiology of acute disseminated encephalitis, the author states his belief that his cases support the view that acute disseminated encephalomyelitis is a disease *per se* which may be brought on or directed against the nervous system by certain febrile exanthematous diseases.

A. T. MATHERS

Gumma of the Brain. D'Aunoy, Friedrichs and Zoeller, *Am. J. of Syphilis* 14: 175, April 1930.

Being much less common than the diffuse inflammatory luetic manifestations in the nervous system, isolated gumma of the brain is infrequently mentioned in the literature. The authors present a full report of a gumma of the right fronto-parietal region, and then proceed to a review of the whole subject.

They point out that in the great majority of cases gummata are a late manifestation of

syphilis, and, since they generally arise in the meninges, are found most often on the surface of the brain involving the cerebral cortex. Symptoms produced are much like those of cerebral tumour and are in no way pathognomonic. Serological tests are often misleading considered alone. The response to medical treatment is on the whole unsatisfactory. Early decompression to relieve pressure, removal of the growth where accessible, followed by specific treatment, is the treatment of choice.

A. T. MATHERS

Habit Clinics. Thom, D. A., *New Eng. J. M.* 203: 19, 1930.

The Habit Clinics were established in an effort to study the child and his environment, in order to find and treat the underlying conditions, whether they were psychological and directly concerned with the child or whether they were sociological and due to an abnormal environment. The group of cases seen at the Clinics is made up of many and varied types of asocial behaviour which may manifest itself in undesirable habits, personality traits, delinquent trends, and physical symptoms. Of the personality traits, cruelty, jealousy, day-dreaming, excessive fears, unusual likes and grudges are common. Of undesirable habits, nail-biting, thumb-sucking, masturbation, temper tantrums are good examples. Of the physical conditions, disturbances of sleep, eating, elimination, headaches, speech defects and certain hysterical manifestations are observed. Of the delinquent trends truancy, lying, stealing, destructiveness, and sex-assaults make up the largest number of cases in this particular group.

The necessity of studying each particular case, that is, the child as well as the environment, and planning treatment according to personal needs must be stressed, as there is a great danger in generalizing too freely and standardizing treatment for groups. The important thing to keep in mind is the underlying motive behind the conduct and that it is essential that this be interpreted in terms of the individual's past experiences, keeping in mind that it is the conduct of extroverted children that annoys, inconveniences, humiliates, and causes adults concern; while the conduct of the introverted child (shyness and diffidence oftentimes brought about by fear), passes by unnoticed or is highly commended. This type of conduct may be the more malignant and one that needs most careful supervision. The function of the Habit Clinic is to deal with these varied problems in relation to the home, social agencies, other medical centres, the nursery schools and kindergartens and to co-operate with all social and medical agencies concerned with the child and his development, thinking in terms of his being a total personality, preparing during these pre-school years to develop habits, conduct patterns and mental attitudes which will serve him adequately later in meeting life with all its obligations and responsibilities. LILLIAN A. CHASE

THERAPEUTICS

The Uses and Abuses of Ultra-Violet Light.

Bunker, J. W. M., *New Eng. J. M.* 202: 1930.

Ultra-violet light is mysterious because it cannot be seen, but whether light is visible or invisible it carries energy. In the body energy which is absorbed in various ways is exhibited in the form of heat, motion, glandular and nervous activity. The layman playing with ultra-violet light is likely to be burned. To say that one has taken an ultra-violet light bath for so many seconds means nothing exact. The distance of the lamp from the surface irradiated, the amount of electrical energy which was transformed into ultra-violet light, the intensity at the various individual bands within the zone of ultra-violet, all these vary tremendously in different cases and have a profound effect on the amount of energy which is absorbed. Until ultra-violet light is so harnessed that it simulates quite closely the distribution of energy and of wave length of the ultra-violet light from sunshine, the two sources of irradiation cannot be used interchangeably without suitable precautions.

Henrichs, working with small organisms, seems to have demonstrated beyond all doubt that small doses of ultra-violet light irradiation stimulate them and larger doses depress them. The survey made in April, 1929, by a committee of the Medical Society of the County of New York gives reports of unfavourable results from irradiation from 15 pediatricists, 14 orthopaedic surgeons, 15 dermatologists and 14 physical therapists and clinicians. These unfortunate results were of all kinds. This committee is of the opinion that the common practice of uncontrolled self-treatment by the layman is undesirable. It would seem that advice in the matter of suitable employment of ultra-violet light upon human beings should be restricted to the few who are becoming expert in the field through study and experience. To play with ultra-violet light is to play with a dangerous agency. Its promiscuous and uncontrolled use upon the human body is to be deplored.

LILLIAN A. CHASE

Blutstillung durch Kongorot. (The Control of Hæmorrhage with Congo Red). Becker, J., *Münch. med. Wchnschr.* 77: 396, March 1930.

On the basis of experiments on animals in which it was found that the injection of solutions of neutral dyes could produce alterations in the matter of the coagulation of the blood, the author injected into a number of patients suffering from hæmorrhagic diatheses of varied etiology chemically inactive Congo Red, without untoward results. He found that the dye shortened the coagulation time and produced an increase of thrombocytes. He concludes that Congo Red is a valuable agent to control hæmorrhage.

A. G. NICHOLLS

PATHOLOGY AND EXPERIMENTAL MEDICINE

What Protects the Skin Against Light?

Miescher, G., *J. of State Med.* 38: 387, July 1930.

After referring to the commonly accepted belief that the decrease of sensitivity of the skin which results from repeated exposure to the sun is due to the deposit of pigment in the epidermis, Miescher goes on to review some of the objections that have been offered to this theory. The congenital hyperpigmentation of the negro's skin gives less protection against light than the pigmentation produced by exposure to light rays. Depigmented areas, as in vitiligo, can develop desensitization to light. The most intense histological changes resulting from exposure to light occur in the stratum Malpighii, that is, in cells situated superficially to the pigment-containing basal layer. For such reasons several authorities have recently minimized the importance of pigment in light-protection. Various alternative theories have not proved more convincing, so Miescher has investigated the matter and presents his findings in the paper under review.

Using the mercury-vapour lamp as the source of the light, our author found that moderate exposure caused changes only in the upper layers of the stratum Malpighii. With stronger exposures the basal layers reacted, while with very strong exposures changes were traced for varying distances into the cutis. When moderate exposures were used it was found that injured areas were scattered between intact areas, and that wherever an injured area was detected there was a thin corneal layer, while the intact areas corresponded with a relatively thick corneum. The degree of sensitivity was found to vary inversely with the thickness of the horny layer. On the palms and soles, where the horny layers may be fifteen to fifty times as thick as in other parts of the skin, it is almost impossible to obtain a light reaction. Thin sheets of horny material, cut with a razor from callosities on the foot, were found to be effective light filters. And exposure to light was found to produce a rapid thickening of the horny layer of the skin. From all of which Miescher concludes that accustomization to light depends mainly on increased formation of the horny layer. In confirmation of this, he states that the conjunctiva of the white rabbit, which has no stratum corneum, is two hundred times as sensitive to light as its unpigmented skin, while the mucous membranes are also highly sensitive.

The protection afforded by the horny layer depends on two factors:—(1) dissemination of light through a cloudy medium, and (2) absorption of light. The second factor proved to be much the more important, as light filters of dried horny layer absorbed very little more than similar filters which had been clarified with glycerine. "The absorptive substances which,

as building blocks of keratin, come into consideration are the aromatic amino-acids such as phenyl-aniline and tyrosin. These absorb the erythema-productive short-wave-length ultra-violet rays just as strongly as quinine."

Pigmentation, however, plays a protective rôle, but to the underlying connective tissue rather than to the epidermis. Raying of a spotted pigmented area with large doses injures both the pigmented and the non-pigmented portions, but under the pigmented parts the cutis is intact while under the non-pigmented parts there is evidence of damage reaching deep into the cutis. The horny layer, therefore, protects the epidermis, while the pigment protects the cutis. It is probable, also, that the pigment has the function of absorbing certain of the caloric rays—the long waved visible and ultra-red rays—and thus prevents an excess of heat from passing the skin. This possibility has not been sufficiently investigated to warrant a definite statement.

W. H. HATTIE

HYGIENE AND PUBLIC HEALTH

Ventilation and Respiratory Illness in Schools.

New York Commission on Ventilation (Winslow, C.-E. A., Chairman), *Am. J. Hyg.* 12: 196, July 1930.

After the submission of its very notable report in 1923, a reorganization of the state government made impossible the continuance of the New York State Commission on Ventilation as a State Commission. It was, however, on the invitation of the Milbank Memorial Fund, reconstituted as the New York Commission on Ventilation in 1926, and has been since carrying on investigations under the new name. We here review two studies made in the schools of Syracuse, covering a period of three years. The first study is largely analytic of the influence of such factors as age, sex, race, and social status, and the size of school districts, on absenteeism, and an endeavour to determine the effect of these factors on the respiratory illnesses of children in attendance at schools with different types of ventilating systems. The second study gives consideration to the rate of air flow and room temperatures in relation to the health of school children.

In general, illness absenteeism was about twice as high between ages five and nine as between ages ten and fourteen. In the first of these age groups, absences were ten per cent more frequent among the girls than among the boys, while this excess rises to twenty-five per cent in the second age group. Absenteeism due to respiratory disease was sixty-five per cent higher in schools of native race stock and forty per cent higher in schools of mixed race stock than in those of foreign race stock—largely Italian. (This difference is presumably related to social and economic status rather than to nationality stock *per se*. A child with slight illness is more likely to be sent to school from the less well-to-do home of

the foreign born than from the home of the more prosperous family of native stock.) The size of the school district did not appear to be a significant factor.

Inasmuch as such factors were not taken into account in the 1923 report, which offered very definite conclusions relative to the bearing of the type of ventilating system in the causation of respiratory illness, it is interesting to note the conclusions reached from the later study: "In the study of Syracuse schools here presented, a group of old-fashioned schools ventilated by furnace inlets and gravity exhaust ducts showed in each of three years lower absence rates due to respiratory disease than did groups of more modern schools ventilated by either plenum or exhaust fans. On analysis it appears that the observed differences were due in part to the fact that the furnace-gravity schools were situated in districts largely inhabited by a foreign-born population. If, however, allowance be made for this factor, these schools still show an apparently lower respiratory disease absence rate than that of the mechanically ventilated schools. We are not disposed to stress the better record of these schools, however. It is evident that the comparison of different schools is open to serious errors and one can rarely be certain that all such errors have been eliminated."

The second study, on the rate of air flow and room temperature in relation to the health of school children, yielded results that are largely negative. Here, too, age, sex, and nationality stock were considered. The results differ from the earlier New York work in failing to show that slight differences in schoolroom temperature exert appreciable effects on the prevalence of respiratory disease. This, of course, does not negate the results of other studies which demonstrate the harmful results of marked overheating. It would appear that the usually accepted standard of thirty cubic feet of air flow per pupil per minute, in fan-ventilated schools, is excessive, and that this may be cut in half without giving significant indication of an unfavourable effect on the health of the pupils as measured by respiratory illness.

W. H. HATTIE

RADIOLOGY

Xanthomatosis (Schuller's Disease; Christian's Syndrome) A Report of Three Cases Treated with Roentgen Rays. Sosman, M. C., *Am. J. of Roentgenol.* 33: 581, June 1930.

Rowland's term "xanthomatosis", used to cover a group of diseases in which the lipid metabolism is at fault, includes the syndrome known as "Defects in the membranous bones," "Diabetes insipidus" and exophthalmos; "Gaucher's disease," "Pick-Niemann's disease" and the various forms of "xanthoma", "xanthoma-myeloma" and "xanthelasma".

Roentgenologically, the most important diagnostic finding is the presence of defects in the

skull, pelvis, or elsewhere. These defects are clean-cut, with irregular edges, affecting chiefly the inner table of the skull. They may simulate syphilis or metastases. The differential point is the absence of a palpable tumour of any size comparable to the defect visible in the Roentgenogram. The diabetes insipidus and exophthalmos, at first thought to be essential to the diagnosis, are held to be but accidents due to the location of pseudo-tumours around the pituitary body or in the roof of the orbit respectively.

A history of preceding trauma or infection, cessation of growth, frequent gingivitis, and occasional jaundice is important. In active growing lesions the histological study shows the typical fat-laden "xanthoma cells" (foam-cells).

The treatment includes x-ray therapy to the areas showing bony defects, the exhibition of a low fat diet, or the use of insulin and a high caloric diet and, sometimes the use of thyroid and anterior pituitary lobe extracts. The prognosis has become brighter as treatment develops. The etiology is unknown. Complete case reports are given of the author's three cases, and a careful review of all other reported cases with very good illustrative x-ray film reproductions.

A. STANLEY KIRKLAND

Visualization of the Pelvic Viscera. Iodized Oil and Pneumoperitoneum combined in Gynecology. Stein, I. F., and Arens, R. A., *Radiology* 15: 85, July 1930.

The technique of the instillation of iodized oil through the uterus and tubes and the introduction of the necessary gas into the abdominal cavity, either by the transabdominal or transuterine path, is minutely described, as well as the preliminary and later care of the patient. This portion of the article is an accurate guide to the physician attempting this diagnostic manœuvre.

In discussing the value of iodized oil injections alone, the writer states that this method reveals abnormalities of the uterus and the patency of tubes, but is not satisfactory and decidedly inconclusive when one attempts to diagnose more remote pelvic disease. Especial emphasis is laid on the diagnosis of hydro-salpinx and the differential diagnosis of an ovarian cyst is described. It is reported that in 1923 the authors have used pneumoperitoneum in the investigation of the female pelvis in 470 cases. In 150 of these cases iodized oil has been used in combination with gas for intra-uterine instillation. There has been no accident or untoward result in this large series, and in none of the cases where operation was subsequently done was there found any evidence of peritoneal irritation or inflammation. This can probably be attributed to the careful selection of patients, the judicious choice of the route of inflation, careful asepsis and antisepsis, and after-care.

A. STANLEY KIRKLAND

Roentgen Ray Findings in Erythroblastic Anæmia. Mandeville, F. B., *Radiology* 15: 72, July 1930.

Reviewing a literature of forty-seven cases of the clinical entity termed "Erythroblastic anæmia", the author states that the Roentgen-ray examination in this condition demonstrates peculiar changes in the bones which are of definite value in confirming the clinical diagnosis. Necropsy reports in six cases tend to confirm the Roentgen-ray findings.

This type of anæmia is characterized by the presence of a very large number of erythroblasts in the circulating blood. The etiology is uncertain. The disease is confined to children of Mediterranean ancestry, especially Italians and Greeks. The patients have a mongolian cast of countenance, yellow muddy complexions, prominent cheek bones, and show a thickening of the cranium due to the laying down of bone in striations perpendicular to the tables of the skull. It is stated that the findings seem to justify its consideration as a definite clinical entity, nevertheless cases will probably be classed for some time under the more general term "Von Jaksh's anæmia".

A. STANLEY KIRKLAND

A Roentgenologic Study of the Breast. Warren, S. L., *Am. J. of Roentgenol. & Radium Ther.* 24: 113, August 1930.

The work reported in this article may not appear to be of immediately practical value but, as Dr. P. M. Hickey pointed out in the discussion, that fault has been found with other contributions which have proved valuable. The technique and posturing of the patient to provide the most informative radiographs of the breast are accurately described. A careful word picture of the normal appearance of the breast as seen on the film is provided. Contrasting with this, such conditions as chronic mastitis, suppurative mastitis, and several forms of carcinoma, and benign tumours are described. The author states that in a series of 119 cases, examined by his technique, several tumours were accurately diagnosed when they were not suspected clinically. Eight cases were wrongly diagnosed, but, on review with greater experience, four mistakes could have been obviated. All cases examined provided diagnoses closely corresponding to autopsy or biopsy findings. The value of stereoscopic and comparison films is stressed.

A. STANLEY KIRKLAND

Gastro-Intestinal Obstruction. Brown, S., *Radiology* 15: 364, Sept. 1930.

The discussion of statistics of obstructed cases indicates that the extremely high mortality rate is due to the failure of the clinician to arrive at to an early diagnosis. It is, therefore, impossible provide the early treatment which is so essential to recovery. The author believes that many surgeons are not aware that x-ray examination

gives frequently very exact indications as to the site and cause of obstruction; also that this information is available rapidly and without unduly tiring the patient who is already so ill.

He quotes the article of Dr. Case, in 1915, in which was described the characteristic appearance of the gas distended bowel found in obstruction. The most acute forms of obstruction can be diagnosed on the plain x-ray film without opaque media. The author also states that the use of the opaque meal or enema has never caused any harm to a patient, whereas their use will enable surgeons to institute treatment much earlier with consequent greater probability of cure.

A. STANLEY KIRKLAND

Subphrenic Abscess. McNamee, E. P., *Am. J. of Roentgenol. & Radium Ther.* 24: 125, Aug. 1930.

A concise review of the literature dealing with the subject is followed by a short description of the anatomy of the subphrenic space and the etiology of the abscess formation. In evaluating the history of cases the author states that two-thirds of all cases follow abdominal operations. Physical signs are those of sepsis. The pulse and temperature are elevated, whereas the respirations are but little disturbed. The liver is rarely displaced downwards, being usually fixed by adhesions and as a result of this the diaphragm is displaced upwards, causing an apparent increase in the vertical liver dullness. The Roentgenological signs, properly interpreted, are of great value. If gas is present in the abscess the resulting fluid level is a valuable sign. Most writers agree that the use of the exploratory needle is dangerous practice and its use should be condemned. The treatment is, of course, free drainage. When this is provided the recovery is rapid, unless complicating conditions are present. An interesting series of case histories is appended.

A. STANLEY KIRKLAND

T. M. Rivers, G. P. Berry and C. P. Rhoads, New York, conclude from their studies that the virus of psittacosis is in the faeces and in the material collected from the nose, mouth and procrop of infected parrots. Parrots and monkeys can be infected by intranasal instillations of the virus. Parrots and rabbits that have recovered from a primary infection are refractory in reinfection. It is not a simple matter to demonstrate

ANÆSTHESIA

Su di un Nuovo Anestetica locale, la "Percaina". (Concerning a new anæsthetic, "percaïne"). Quarella, B., *Minerva Medica.* 2: 921, 1929.

At Professor Bobbio's clinic, percaïne was used 150 times for local regional and spinal anæsthesia. The operations were of all degrees of severity. The action of percaïne is much more prolonged than that of other local anæsthetics, lasting sometimes 10 or 12 hours. When used intraspinally the condition of the patient was satisfactory throughout. Collapse was never seen. One to two per cent solutions applied to mucous membranes cause anæsthesia equivalent to that obtained with 10 to 20 per cent solutions of cocaine. Percaine can be used with advantage in suppositories for painful affections of the anus and rectum.

W. B. HOWELL

Eliminating the Explosion Hazard in Operating Rooms. Hoover, P. L., and Cutler, E. C. *The Modern Hospital* 35: 49, July 1930.

Two per cent of ether or ethylene vapour in the atmosphere of a room produces an explosive mixture. Ignition may be due to the presence of gas in spirit burners, to a lighted cigarette, cigar or pipe. Most explosions in operating rooms have originated from static sparks developed within anæsthetic machines. The gases may become electrified by friction with the valves when expanding from a high to a low pressure, by the normal expansion and contraction caused by the breathing of the patient. The best method of abolishing static sparks in an operating room is by maintaining a high humidity, that is to say 65 per cent. This can be done by means of a humidifier. To prevent discomfort the temperature must be kept between 65 and 73 F. Even with this degree of humidity static sparks may occur inside anæsthetic machines. Metallic inserts, properly constructed, must be used in the rubber hose connections. The rubber bags must contain wet sponges. A simpler method is to use apparatus in which the gases bubble through water. It must be remembered that ether vapour and ethylene are more explosive than gasoline.

W. B. HOWELL

neutralizing properties in convalescent human serum. In parrots and in mice, the principal lesions occur in the liver and spleen. Young monkeys (*Macacus rhesus*) are susceptible to intracerebral, intratracheal and intranasal inoculations of psittacosis virus. When it is instilled in the nose or injected in the trachea a characteristic pathologic picture occurs in the lungs which is similar to that observed in man.—*J. Am. M. Ass.*, Aug. 23, 1930.

Obituaries

Dr. William Macdonald Adams, who died recently in St. Joseph's Hospital, aged 54, was known for many years as a practitioner in medicine and pharmacy in Toronto. Born and educated in Galt, he graduated from the Toronto School of Pharmacy, and later, in medicine, from Western University, London, Ont., in 1904. He is survived by his widow, and one son, Billy, of Toronto, and by his sister, Mrs. F. E. Lucas.

Dr. William Lockwood Thornton Addison. A stroke suffered on September 5th at his home, 431 Broadview Avenue, resulted in the death of W. L. T. Addison, B.A., M.D., a prominent Toronto physician, at the age of 60. Dr. Addison had been in failing health for several months.

He was the son of Rev. Peter Addison, a Methodist minister. He was born at Horning's Mills in 1870, and secured his early education at schools in the various places where his father preached. Later he entered Victoria College and the University of Toronto, from which he graduated in arts in 1893, and two years later in medicine.

He was granted the degree of M.D. in 1898. For some time he was pathologist at the Ontario Veterinary College, and medical officer for the Wm. Davies Co., Ltd. Dr. Addison represented Victoria University on the Council of the college from 1912 until the date of his death. He was a member of Simpson Ave. United Church and is survived by his widow, Mrs. Janie Hillock Addison, two sons, and two daughters; a brother, Rev. A. P. Addison, of Toronto, and two sisters.

Dr. James Alexander Anderson, M.P.P. for South Lanark, died in Toronto on August 4, 1930, after a short illness. Dr. Anderson, who was 60 years old, was taken suddenly ill a few days ago and was removed to the Lockwood Clinic, Toronto. Dr. Anderson was elected to the Provincial Parliament last fall, when he defeated J. E. Anderson, Liberal, of Bathurst. Born in Oxford Mills, he spent his entire life in Lanark district. Going to Smiths Falls he served an apprenticeship in a drug store, and in 1894 entered the College of Pharmacy. On graduation he operated a drug store there until 1899, when he decided to enter the medical profession. Attending Trinity Medical College, he graduated in 1903.

Dr. Anderson was a member of the Smiths Falls Board of Education for fourteen years, and Chairman two years. Elected Mayor in 1923, he held this position for five years, withdrawing from municipal politics in 1928. He served as a member of the Board of Health, the Hydro-Electric Commission, the Water Commission, the Library Board and the Chamber of Commerce. He was also a member of the I.O.O.F., I.O.F., C.O.F., and of the Masonic and Orange orders. He was a member of the staffs of the Public and St. Francis Hospitals, and also of the Ontario Medical and Canadian Medical Associations. He held a commission as Lieutenant in the Army Medical Corps during the war and was Medical Officer of the 130th Battalion.

Dr. John A. Campbell, a retired physician, who formerly practised in the Border Cities, was found dead in bed, at his home on the lake shore, west of Cedar Spring, on July 30, 1930. Dr. Campbell, who was 55 years of age, appeared to be in his usual good health when he retired for the night. As a young man, he was

a school teacher and after graduating in medicine first practised in Listowel. He subsequently moved to the Border Cities. Since his retirement a few years ago he had lived on his lake shore farm. Besides his wife, surviving are two brothers and two sisters.

Dr. J. C. Gadbois, late Director of Parks and Playgrounds, died of pneumonia at his home in Montreal on August 22nd, aged 62. He was born in St. Jean d'Iberville in 1867, and graduated in Medicine from Laval University beginning to practise at the age of 25. After some years' practice he devoted himself almost entirely to the promotion of sport, at one time acting as manager for the boxer, Rioux. In 1898, he helped to found the Canadian Club, and his zeal for the outdoor sport brought him into the municipal limelight, marking him out as suitable for developing the parks and playgrounds for public use. His death is widely mourned.

Dr. J. B. Gilchrist, of Norton, N.B., died on August 17th. Dr. Gilchrist was widely known throughout the Maritime Provinces both as a physician and as a sportsman. He was 65 years of age. He had practised in Norton for seventeen years. Before that his practice had been at Sussex and Glenwood. Dr. Gilchrist was born in Saint John, and was unmarried.

Dr. Arthur Gunn, of Weston, who for some years had been associated with the staff of Christie Street Hospital, died at that institution on August 15, 1930. A native of Durham, the late Dr. Gunn, who was in his fifty-eighth year, at one time practised at his home town and later at Woodstock, after graduating from McGill University in 1895. After the Great War he served for a time on the staff of Brant Military Hospital, Burlington, moving from there to Newmarket, where he became Medical Superintendent at the York County Hospital. For the past few years he had lived at Weston. He is survived by his widow, formerly Florence Mary Vair; two sons and one daughter.

Dr. David L. Heggie, of Brampton, Ontario, died on August 17th, aged 63. He was a graduate of the University of Toronto in 1890 and became licentiate of the Royal College of Physicians, Edinburgh in 1891. Many tributes of affection and respect were paid to his memory at his interment in Brampton Cemetery.

Dr. Garnet Woolsey Holmes, died shortly after Friday midnight in the Public General Hospital at Chatham, to which institution he was admitted to undergo an emergency operation for appendicitis. For several years he had suffered from a weak heart, and it was that condition which added to the seriousness of the operation which he had to undergo. Dr. Garnet Holmes was born on January 9, 1874. As a young man he was a clever student, and, early in life he decided to follow in the footsteps of his father in the medical and surgical profession. He established a brilliant career at the university, graduating from Toronto in 1898. He then took post-graduate work in London, England, Germany and Austria, finishing his special studies in eye, ear, nose and throat work in Vienna. Two years was taken up with his studies and travel abroad, and then he returned to his native city and established a practice. He practised successfully for several years, and eventually turned his practice over

to his younger brother, Dr. Shirley Holmes, who has continued it ever since. Since his retirement from active medical and surgical practice, Dr. Holmes has been interested in several successful financial ventures, and he has also done considerable surgical work, being in constant demand among members of the surgical profession, for his ability in the administering of anaesthetics. He was a constant attendant at the Chatham Club, where he was most popular with all who knew him. Dr. Holmes was the eldest son of Dr. and Mrs. T. K. Holmes. Other surviving relatives are two brothers, Dr. Kingsley Holmes and Dr. Shirley Holmes, and one sister, Mrs. R. L. Pattinson.

Margaret Gardner Hogg, M.B., Ch.B. (Glasgow, 1904), passed away in Vancouver on June 25, 1930, following a motor accident. Dr. Hogg practised in Vancouver for many years, being at one time engaged in work for the city schools. She is survived by her husband, Mr. J. Pitcairn Hogg, a prominent barrister of this city, and by two children, Gilbert and Margaret. The funeral took place from Christ Church Cathedral on June 28th and was attended by many of the medical profession.

John Charles Macdonald, M.D., C.M., died at his home in Mount Stewart, Prince Edward Island, July 15, 1930, aged 55 years. In apparent good health until two and a half months ago, his last illness, carcinoma of the stomach, developed and terminated with dramatic rapidity. Dr. Macdonald was born and received his early training in Prince Edward Island. He obtained his academic degree at St. Dunstan's University, Charlottetown, later entering McGill, from which he graduated in 1905. He served in the C.A.M.C. during the late war. With this exception he was in active practice in Prince Edward Island up to the time of his illness.

He was a man highly respected by all. Among his medical colleagues he was known as a fair-minded, capable, hard working physician. His keenness in availing himself of every opportunity to keep abreast of the latest advances in medicine was particularly noteworthy. He was unflinching in his attendance at local clinics and medical society meetings, although this often meant for him long and arduous trips over bad roads. His devotion and unselfish service won for him the warm affection of his patients. His tragic end, at such an early age when he could reasonably hope to still have the best of life before him, has been the source of very real grief to his many friends.

Dr. Salton McGibbon, a specialist in the treatment of diseases of the eye, ear, nose and throat, died on August 8th. He had been in poor health for some

time and his sudden and unexpected death followed on an operation which it was hoped would cure the condition. Dr. McGibbon was born in 1878 at Arkona, Ont., and graduated in 1902 at McGill University. After graduation he practised in hospital work in Mexico until 1912, when he left to take up post-graduate study in London, Vienna and Berlin. Coming to Edmonton in 1913, he and since practised his specialty with marked success and was regarded as one of the most skilful practitioners in the province. In 1913 he was married to Miss Berta Gottlieb, of Vienna, and is survived by his widow and one son Rolph Wilfred, four sisters and three brothers, all of whom are medical practitioners and residing at Los Angeles, Cal., Bracebridge, Ont., and Honeywood, Ont., respectively. His untimely death is greatly regretted by his medical confrères everywhere.

Dr. Benjamin George Stephenson. The death took place on August 28, at the Western Hospital of Benjamin George Stephenson, M.B., son of the late James and Sarah Jane Stephenson, Toronto, and grandson of the late Robert and Frances Stephenson, Belfast, Ireland.

Dr. Stephenson was born and educated in Toronto. He was a graduate of the Faculty of Medicine, University of Toronto, 1918, and also of the College of Physicians and Surgeons, University of Illinois. He was a member of Phi Chi Fraternity and an honorary life member of Orient Lodge, A.F. and A.M., and also a life member of Royal Arch Chapter of St. Andrew and St. John and a member of Yonge Street United Church.

Surviving are his widow, Rachelle Copeland Stephenson; one brother, and four sisters.

Dr. William Tassie Wilson, who was formerly Superintendent of the Ontario Hospitals at Cobourg and at Penetanguishene, died unexpectedly on August 2, 1930, at his home in Cross Street, in Dundas. He was 63 years of age, and was a brother of Gordon C. Wilson, M.P.-elect for Wentworth.

Dr. Wilson retired from active life a few years ago owing to failing health, and returned to his native town. He was a graduate of the University of Toronto, Victoria University (1892) and the Royal Victoria Hospital in Dublin. Dr. Wilson was named for the late Dr. Tassie of Galt, who was a friend of his father's.

Besides his widow, Dr. Wilson is survived by one son, Gordon Ellis Wilson; one brother, Gordon C. Wilson, and a sister, Mrs. W. H. Dixon of Dundas.

Dr. John Dixon Webster, of Toronto, died on August 11, 1930, in his 74th year. He was a graduate of the University of Toronto, in 1898.

OBSTETRICAL ANÆSTHESIA IN PRIVATE PRACTICE.—M. Henkel finds morphine very valuable in midwifery practice when given at the right time and in correct dosage. Scopolamine-morphine anaesthesia, as introduced by Schneiderlin, has, he thinks, many disadvantages, particularly the uncertainty of action, possible fetal asphyxia, and severe hæmorrhage, but on the whole he considers it less dangerous than the newer methods. Goldschmidt and Putz have each published a series of cases treated with pernocton, just under 200 in all; they had two cases of post-partum eclampsia; many patients became seriously excited, so that some had to be held down forcibly; in some instances the pains became weak, necessitating the use of pituitary extract and forceps. With avertin similar results are reported; it is given by the rectum, render-

ing the effect very variable, as absorption rates differ so widely in different cases. Pitkin's new method consists of infecting a strong, concentrated solution of novocain into the lumbar region of the canal; it sinks towards the coccyx, cutting off the sensory paths and leaving the motor ones unaffected. Müller has treated 30 cases by this method; 4 complained of headache afterwards, and 4 required uterine stimulation. The anaesthesia lasted two and a half hours. Henkel does not consider that the ideal obstetrical anaesthetic has yet been found, nor does he think that in every case an entirely painless labour is desirable. He finds that light ether anaesthesia for the passage of the head is sufficient, since it allows any necessary manipulation and has no bad after-effects.—*Med. Welt*, p. 739, May 24, 1930.

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CANADA

News Items

ALBERTA

Preliminary steps were taken recently at High River for the establishment of a health unit. There were present Dr. S. F. Covington, representing the Rockefeller Foundation, the Hon. George Hoadley, Provincial Minister of Health, and Dr. M. R. Bow, Provincial Deputy-Minister of Health. The High River district includes the territory lying between the towns of Turner Valley, Okotoks, Vulcan, Blackie, Nanton and High River. In this area there are six municipal districts. A temporary committee of two representatives from each municipal council and town council was formed and will meet in High River on September 17th to arrange details. There is a population of 13,000, with approximately 3,600 school children, in this district. The service would include one qualified full time physician, two assistant nurses, and a secretary and there would be a central office. The work will include child welfare, with the examination of every child at least once a year. A life extension program for adults and for children and general health education will be in operation. There will be an approximate cost of \$12,000.00. Fifty per cent of this will be carried by the Provincial Government for the first three experimental years; 25 per cent by the Rockefeller foundation and 25 per cent by the unit itself. After the first three years a heavier share will be taken by the unit if results justify them in continuing the work. The Hon. Mr. Hoadley expressed his opinion strongly in favour of this undertaking. The province was under a heavy expense in supporting sanatoriums and other medical institutions. Many of the patients need never have lost their health if they had had little preliminary safe-guarding. The health of the children was the foundation work on which to lessen the mounting cost. He also remarked that if the two units at High River and Red Deer proved successful the work might be carried on throughout the province.

Lord Dawson of Penn was a guest of the Canadian Club and of the Rotary Club members on September 2nd at the Palliser Hotel to which members of the

Calgary Medical Society were invited. Lord Dawson gave a very illuminating address on some of the trends of modern medicine.

About one hundred and fifty of the members of the British Medical Association who have been touring the west, following the meeting of the British Medical Association at Winnipeg, were guests of the City of Calgary and of the members of the Calgary Medical Society on September 11th. Among the attractions offered was a visit to Mr. P. Burns' ranch east of Calgary, where a rodeo was staged for the visitors.

Only words of praise were voiced by members of the Alberta Medical Association who were present at the British Medical Association at Winnipeg. Not only was the scientific program enjoyed but the varied social functions as well. A meed of praise must be accorded those who organized this splendid meeting.

Professor A. Munroe of the University of Alberta has returned from London, where he was investigating the radium treatment of cancer.

A pleasant event took place in Calgary when a presentation was made to Dr. A. S. Estey on his departure for Vancouver where he intends practising in future. This token of good will and friendship came from the members of the Calgary Medical Society among whom he was deservedly popular. He will be missed by the many friends he made here during his long residence.

Dr. Salton McGibbon of Edmonton died suddenly on August 8th. He was well known as a specialist in diseases of the eye, ear, nose and throat.

Dr. E. P. Scarlett, formerly Professor of Medicine in the State University of Iowa, has joined the Calgary Clinic. He is a graduate of the University of Toronto.

G. E. LEARMONTH

NEW BRUNSWICK

The extra-mural lecture course for August was presented at Fredericton, Woodstock, Newcastle, Moncton, and Saint John. The speakers were Dr. L. H. McKim, of Montreal, who spoke on "Fractures of the ankle joint." His address was both historical and practical, linking the work of Dr. Pott with the present day methods of treatment of ankle joint fractures. Dr. Ivan Patrick, of the Montreal Maternity Hospital, spoke on "Dystocia and other problems of difficult labour." The attendance at the meetings was satisfactory, and the speakers received a flattering welcome.

The meeting of the Canadian Medical Association in Winnipeg attracted a larger number of eastern visitors than usual, owing to the fact that it was also a meeting of the British Medical Association. Among the prominent physicians from New Brunswick attending the Winnipeg meeting were: Dr. R. J. Collins, of Saint John; Dr. Perry Knox, of River Glade; and Dr. Arthur Melanson, of Fredericton. All of these were especially interested in tuberculosis work. Among the general physicians, Dr. W. W. White, Hon. Dr. Murray MacLaren, Dr. Mayes Case, Dr. D. C. Malcolm, and Dr. G. Clowes Van Wart were noted.

On August 3rd, the corner stone of the new General Hospital at Saint John was laid by Dr. W. W. White, Mayor of the City of Saint John. The ceremony was the occasion for the gathering of many persons prominent in the civic and provincial governments. The construction of the building is being hurried forward, and the architects and contractors expressed themselves as satisfied with the progress.

Dr. A. L. Winsor, recently an interne at the Saint John General Hospital, has started practice at Norton, N.B.

Dr. R. A. Hughes, of the Nose and Throat Staff of the Saint John General Hospital, sailed this month for England, where he will spend four months doing post-graduate work in Nose and Throat and Ophthalmic work.

Dr. G. M. Weir, of the University of British Columbia, is at present conducting a survey of the nursing situation in New Brunswick. Dr. Weir has spoken at several of the larger training schools and has interviewed the Nurses' Association in the larger towns.

A. STANLEY KIRKLAND

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CANADA

NOVA SCOTIA

Nova Scotia sent a rather small delegation to the Winnipeg meetings. Many who had planned to attend found it impossible to leave their practices. Those who were fortunate enough to get away have brought back glowing accounts of the meeting, and of the splendid preparations made by the Winnipeg profession. Dr. G. Tompkins, of Dominion, who, with Mrs. Tompkins, took a steamer from Sydney for Montreal, had the rather harrowing experience of shipwreck en route, but was nevertheless able to complete the trip—although it involved a speedy motor drive in order to make a train connection.

It was a great disappointment to the Bluenose profession that none of the party from overseas made the trip outlined for the Maritime Provinces. The only one to come to Halifax was Dr. Mack Creighton, a Dalhousie graduate of 1912, now practising in London, who visited his home town en route to Winnipeg and was warmly welcomed by his old Halifax friends.

A fair recently conducted for the benefit of the Digby Hospital proved very successful and netted some \$3,500.00 for that institution.

The Dalhousie Medical School has opened the session of 1930-31 with all classes filled to capacity. Dr. Dreyer, the new professor of pharmacology, and Dr. Mainland, the new professor of anatomy, are well installed in their new positions, and all members of the staff who were on holiday have returned and resumed teaching.

This year's refresher course for physicians, conducted by the medical faculty of Dalhousie, proved very successful. There was an excellent attendance, and all who attended expressed appreciation of the quality of the instruction. Quite a number of new faces were seen, but the most pleasing feature was the return of several who have been regular attendants for years and whose reappearance year after year is regarded as the best evidence of the popularity and usefulness of the course. This year the faculty had the assistance of Drs. J. Hepburn and W. G. Cosbie, of the University of Toronto, whose lectures were greatly appreciated. Their presence was made possible by the kind coöperation of the Committee on Post-graduate Instruction of the Canadian Medical Association.

W. H. HATTE

QUEBEC

Two bequests are gratefully acknowledged and appreciated by the board of management of the Montreal General Hospital. Under the will of the late James A. Taylor, the funds will benefit annually from the revenue of a trust fund of \$125,000 and under that of the late William Haeston, of Howick, the sum of \$1,000 has come to the hospital. The latter will be divided equally between the central and western divisions of the hospital.

In spite of rumours that there had been outbreaks of diphtheria in Montreal it was announced at the City Hall that conditions in regard to this disease showed considerable improvement over the same period last year, and that so far as cases and deaths were concerned this week showed improvement over preceding weeks. Dr. S. Boucher, director of public health, said that the city is enjoying a good season.

The numbers of cases of diphtheria have materially diminished since the immunization was started some 18

months ago. The number of cases last year showed a decrease over the preceding years. Deaths diminished also, proving that the serum had the effect of minimizing danger even if the child took the disease.

There are 36 vaccination bureaux in the city. It is proposed to start a campaign in the schools, the director said, and to invite all school children to take the serum. Where there is no vaccination depot within easy reach of a school, the city will open temporary bureaux in the schools.

The Health Department has issued in pamphlet form the list of all vaccination bureaux, also the depots where serum can be obtained free of charge by doctors. These pamphlets can be obtained from the health department in the City Hall Annex, Gosford Street.

Announcement has been made of the resignation of Dr. C. Hayward, Superintendent of the Montreal General Hospital. Dr. Hayward goes to British Columbia to take charge of the Vancouver General Hospital.

SASKATCHEWAN

The Workman's Compensation Act is now law. In some cases there seems to be a difference of opinion between those who administer the act and the attending physician as to the value of the medical services rendered. Doubtless this will soon be adjusted to the satisfaction of all concerned.

Delegates from the British Isles spent three hours in Regina, on the rainiest day of the season. After

a drive around the paved streets the party was taken to the Legislative Buildings where they listened to speeches by Dr. McAllister, President of the Regina and District Medical Society; Ald. Gardner, Deputy Mayor of the city and Hon. F. D. Munroe, Minister of Health. A buffet lunch was served in the legislative library by the Saskatchewan Government.

LILLIAN A. CHASE

Through the co-operation of THE GOVERNMENT OF NEWFOUNDLAND at the recent Winnipeg convention of THE BRITISH and CANADIAN MEDICAL ASSOCIATIONS

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UNITED STATES

A New Institute for Mental Hygiene

The Pennsylvania Hospital announces the opening of its Institute for Mental Hygiene which is planned for patients who will meet the physicians more than half-way in recognizing that they need help from fatigue, worries, fears, maladjustments, difficulties in getting on with other people or at their work. The services are for both out-patients and resident patients. There are private accommodations of any type desired for those who remain at the Institute for extensive diagnostic service and treatment. Mental factors as well as physical will be sought out and treated. Classes in occupational and physical therapy, music, and recreation can be used by out-patients or by the patients of any member of a County Medical

Society who wishes to make arrangements for them with the occupational or physical director. Children will be received in the out-patient department and in the Franklin School for problem children. The Institute is not licensed and cannot receive any committed patient. It will be greatly interested in toxic mental disturbances and in problems of general convalescence.

Patients may be referred for supervision and treatment or for consultation only. When patients are referred for treatment, the Institute invites the physician to act as consultant. Applications for private patients should be made to Miss Anna L. Frost, 11, N. 49th St., Philadelphia, and for other patients to Miss Elizabeth McCord, or by letter to Lauren H. Smith.

GENERAL

Relief of Unemployment

As a measure towards relief of unemployment the board of trustees of Ottawa Civic Hospital have decided to provide an eight-hour working day for nurses on the staff. Three shifts of nurses will now be employed daily, in place of the present double shift of 12 hours each.

Accidental Deaths in Childhood in U.S.A.

American life is getting safer for children but more dangerous for everybody else, it is reported by the Millbank Memorial Fund of New York City as a result of a recent analysis of figures for accidental deaths between 1921 and 1927. During this period the analyses show that fatal accidents to boys under five years old, in proportion to the population, decreased 17 per cent. Girl babies seem to be even safer, for the fatal accident rate to girls under five decreased in the same period by nearly 24 per cent. Boys from five to 14 also find the

world a safer place in 1927 than in 1921, the difference being 9.6 per cent. Girls from five to 14, however, did not experience this benefit for the fatal accident rate for this group in 1927 was 1.5 per cent greater than in 1921. Probably the reason for this is the increasing entry of girls of this age into sports, automobile driving and other more or less dangerous activities. The greatest increases in the percentage of accidental deaths are taking place, however, among men past middle age. Of men, between forty-five and fifty, 34 per cent more were killed accidentally in 1927 than in 1921. Men between 55 and 64 are still less safe, for 41 per cent more of them were killed by accident in the latter year than in the former. Very old people, whether men or women, show smaller increases in the percentage killed by accident, which may mean that the changes of habits which make the present time more dangerous for middle-aged people have not been shared so completely by persons over 70.

Book Reviews

Essays and Addresses, Sociological, Biological and Psychological. By a Surgeon. 277 pages. Price 10/6d. H. K. Lewis & Co., Ltd., London, 1930.

The word "essay" is hardly applicable to any of the addresses contained in this volume, if one is right in feeling that an essay should be more of a philosophical discussion of some topic than a didactic presentation of views, which these addresses more closely resemble. In each one, the author deals with a topic of social interest, and after dissecting it, offers suggestions for remedying the evils which he sees.

The chief value of these papers lies in the fact that each one contains a very suggestive idea or two, if the reader will search for them. They are not easy to find, and herein is the greatest defect of style of which one has to complain. There is a lack of consecutiveness and coherence and though most of the addresses are ended by a "conclusion" in which one would expect to find a summary of the ideas set forth in the main body of the address, the writer bewilders the reader by starting out on fresh paths and side-tracks, when one thinks he has reached the end of the road. But a great deal of conscientious thought and work has gone to the writing of these addresses, and the student of sociology will find much to interest him and awaken discussion.

Fractures and Their Complications. George Ewart Wilson, M.B. (Tor.), F.R.C.S. (Eng.), F.A.C.S., Surgeon-in-Chief, St. Michael's Hospital, Toronto, etc. 415 pages, illustrated. Macmillan Co., Toronto, 1930.

This is a most comprehensive work. The author gives his views on fractures of practically every bone in the body. The vast amount of matter covered in a book of its size might be considered an objectionable feature but for the marginal paragraph headings which render its reading much easier.

Chapters I and II, on "General Considerations" and "Repair", present excellent and concise accounts of the present generally accepted views on these subjects. The chapter on Physiotherapy is full of sound common sense, the dangers of too early and of unskilful movements, also the advantages of occupational therapy and "will to get well" being particularly stressed. The reduction of practically all fractures under a fluoroscopic screen is strongly advised throughout the book. Alternate methods where a screen is not available are discussed.

In the consideration of fractures involving the ankle joint the old nomenclature of "Pott's and Dupuytren's" is retained. The author has apparently not seen fit to adopt the now fairly widely accepted classification of

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Ashurst. Many surgeons will strongly disagree with the rule of leaving the first plaster on for five weeks and then removing, replacing it with a flannelette bandage only, without regard to the type or degree of the original injury. The reversed Pott's type of ankle joint injury is merely mentioned.

As tibial flexion injuries probably number at least ten per cent of all fractures involving the ankle joint, it would seem as if a few words of warning as to their disastrous results when unrecognized or treated as the commoner types might have been appropriate in a work in most respects so excellent.

Hypertension. Leslie T. Gager, Clinical Professor of Medicine, George Washington University. 126 pages, illustrated, with complete bibliography and index. Price \$3.00. The Williams and Wilkins Company, Baltimore, 1930.

This monograph deals with arterial hypertension as a primary disorder of vasomotor function. It is a veritable encyclopædia of references carefully reviewed and presented to the reader in such a way as to bring out the main facts bearing upon the subject.

The historical background of hypertension is lightly passed over. Considerable space is devoted to the development of the physio-pathological factors underlying the disease. The much-debated question of the relationship of nephritis to arterial hypertension is discussed at some length. According to the evidence presented, it would seem that hypertension cannot result from changes of a purely mechanical nature in the kidney alone. The theory of the etiology of hypertension based upon generalized arteriolar spasm is convincingly developed, and the various factors which bring about this change are discussed at some length. The author side-steps the rather academic question as to whether hypertension *per se* gives rise to any characteristic symptomatology. A few of the arguments are detailed but the subject is allowed to remain an open one.

The chapters on prognosis and on treatment are, perhaps, the best in the book. It is here for the first time that the author takes command. The wealth of literature devoted to this phase of the subject is dealt with in a masterly fashion, divulging something of the clinical experience and acumen of the author. The book is an excellent reference volume on arterial hypertension, but the author has run the risk of being a trifle dull in order to preserve the utmost accuracy and detail.

Burns: Types, Pathology and Management. George T. Pack, B.S., M.D., and A. Hobson Davis, B.S., M.D. Price \$6.00. J. B. Lippincott Co., Philadelphia, London and Montreal, 1930.

This book is a new monograph on the subject of burns. At the close of each chapter is a very voluminous list of references, showing that apparently the world's literature has been widely consulted. If any criticism of this were made, it would be that too many writers' names and references are used in the text, tending to interfere with the smoothness of the subject matter.

The pathology of burns, both in the tissues destroyed and in the viscera secondarily affected, is well presented and well illustrated. The blood changes, the chemistry of the blood and the other body fluids are thoroughly gone into, so much so that sometimes one loses track of the major subject. The authors discuss at great length the various theories regarding the toxin of burns and conclude that the "toxin of burns is unknown."

The chapter on immediate and systemic treatment is one to read over now and then, no matter how many cases we treat, as it emphasizes the necessity of treating the patient first and the local burned area second. The authors stress the value of Davidson's tannic acid treatment, and the simple mixture of four teaspoonfuls of the tannic acid powder to a glass of water, which produces a 2½ per cent solution, should be known not only to every physician but to every industrial plant, as a primary wet dressing. Every form of treatment is discussed, and the methods of applying the various applications are given in detail and are well illustrated. This also applies to

the treatment of the results of burns, keloids, contractions, scars and the serious deformities. The necessary plastic operations are described, and all in all the book is a most complete exposition of burns and their results.

Electrical, Roentgen ray, radium and lightning burns are accorded a chapter each, and make interesting reading, though nothing very new is offered. The book will appeal to the teacher and the surgical chief, but it is so full that the general practitioner and the occasional surgeon will be confused by its somewhat extensive detail. The work is a retrospect rather than a presentation of original work, and will be of value as a volume of reference.

Cancer of the Lung and Other Intrathoracic Tumours.

By Maurice Davidson, M.A., M.D., B.Ch., F.R.C.P., Physician to the Brompton Hospital for Consumption and Diseases of the Chest, etc., with foreword by Arthur J. Hall, M.A., M.D., D.Sc., F.R.C.P., Professor of Medicine in the University of Sheffield. 173 pages, 62 illustration. Price 17/6 net. Bristol, John Wright & Sons, 1930.

No well informed practitioner can now be unaware of the fact that pulmonary cancer is increasing in frequency. It is always wise when dealing with pulmonary disease to think first and longest of tuberculosis. But experience shows that the possibility of its being cancer is becoming so likely that this must be given more and more consideration. Especially should the possibility of cancer be entertained when it is realized that whatever chance of effectively treating it exists (and at best this can only be very slight) depends much on early recognition of the disease.

These are points which occur to one after reading this excellent survey of cancer of the lung. One learns how unmistakable is its ominous increase and one realizes how little is understood of the factors responsible for the increase. The pathological side is dealt with concisely, most space being devoted to the clinical and diagnostic sides.

It can be recommended as a very thorough review of a subject which is occupying our attention to a greater extent each year.

Medical and Surgical Year Book. Physicians' Hospital of Plattsburg. Vol. 1, 1929. The William H. Miner Foundation. 322 pages, illustrated. Price \$3.50. Distributor, The Superintendent, Physicians' Hospital of Plattsburg, N.Y., 1930.

The spirit of William Beaumont, "America's pioneer physiologist" animates this excellent report. That many parts of America supplied the contributors was particularly fitting when one realizes that the accidental shooting of Alexis St. Martin, a French Canadian made it possible to originate the world-famous studies in digestion. Some of the experiments were performed while Beaumont was practising in Plattsburg and his "Physiology of Digestion" was published there in 1833.

The aim throughout is supplementary to medical college work, to aid senior students in the study of early degenerative changes, looking towards prevention, that people might learn to live within their physical limitations. The following subjects were treated in so far as they related to cardio-nephritis, physical examination, diagnosis, cardiology (including heart tracings), x-ray, dietetics, examination of blood and urine, detection of focal infections. The after-effects of diabetes on the heart, kidneys and blood pressure received special emphasis.

Dr. Walter R. Steiner, of Hartford, Conn., gave an address on "Dr. William Beaumont, an Appreciation." He pointed out that it was Osler who "brought him out of the obscurity into which we practical moderns had been allowing him to drift." He also stated that "a prophet is not without honour even in his own country, for to-day you are to dedicate a tablet to him in this town where he conducted two of his four series of experiments." Beaumont wrote in the preface of his book on digestion "I submit a body of facts which cannot be invalidated. My opinions may be doubted, denied or approved according as they conflict or agree with the opinions of each individual who may read them; but their worth will be

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M.D., Riverhurst, Sask.

best determined by the foundation on which they rest—the incontrovertible facts.”

This Year Book is one of which the Plattsburg hospital might well be proud. It carries a complete index, has many good illustrations and is well printed on good paper and covers well a wide range of medical subjects.

Seventy Birth Control Clinics. Caroline Hadley Robinson, with foreword by Robert Latou Dickinson. 238 pages. Price \$4.00. Williams & Wilkins Co., Baltimore, 1930.

Recent discussion of the question of birth control at the Lambeth Conference brought to the attention of the world at large, a movement strangely unrecognized by the vast majority of the medical profession. This book deals with a survey of 70 specially equipped birth control clinics in Europe and the United States, and it is noteworthy that while the 70 were being investigated, an additional 250 were discovered, actively at work often with Civic or State support. For the opening of these new centres the record of this survey is an indispensable guide for those interested in securing the most satisfactory results. The history and practice of the best organized birth control clinics is detailed, and incidentally it may be noted that Aberdeen (Scotland), has a centre “established under the auspices of the official Mother and Child Welfare Committee of that city.”

Medical aspects of the question, the planning of accommodation, details for histories, qualifications necessary in the staff and the scope of their activities are admirably treated, chiefly, we suspect, by Dr. R. L. Dickinson. A readable second section deals with the legal aspect of birth control, the effect of birth control on the quantity and the quality of the population, and, finally, the benefits to be expected from birth control as opposed to its alternative, indiscriminate abortion.

The bibliography is full and extremely well arranged, and on the whole a tremendous amount of interesting and particularly instructive material is provided.

Plarr's Lives of the Fellows of the Royal College of Surgeons of England. Revised by Sir D'Arcy Power, K.B.E. (Mil.), F.R.C.S. (Eng.), with the assistance of W. G. Spencer, O.B.E., M.S., F.R.C.S., and Professor G. E. Gask, C.M.G., D.S.O., F.R.C.S. Vols. 1 and 2. Price \$12.00 set. Printed and published for the Royal College of Surgeons by John Wright & Sons, Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1930.

These handsome volumes are published as the Thelwall Thomas Memorial, the cost of their preparation being borne by a bequest of £5,000 left to the College by Mr. Thelwall Thomas, F.R.C.S., England, Liverpool. They open with a reproduction of the Charter of the College as originally issued in 1843, the preamble of which shows that “the rank and file of surgeons have always been a wilful and perverse generation, turbulent and claiming rights which they never had.” But with the establishment of the College in 1843 a successful effort was made to raise the profession of surgery to its present high position in England.

The lives while necessarily compressed contain many anecdotes of notes of personal interest. The volumes will form a valuable addition to biographical works of reference.

Diseases of Nose and Throat. Cornelius G. Coakley, A.M., M.D., F.A.C.S., Professor of Laryngology and Otolaryngology in the College of Physicians and Surgeons, Columbia University, etc. 7th revised edition. 672 pages, 160 illustrations. Price \$4.50. Lea & Febiger, Philadelphia, 1930.

The chief additions in this edition have been to incorporate established advances in diagnosis and treatment but anything of a controversial nature has been omitted. Conditions of the nose, pharynx and larynx are each considered separately. Each disease is completely and concisely dealt with—all important points of symp-

tomatology, pathology, diagnosis and treatment being considered. The chapters on Vasomotor Rhinitis, Intubation and Tracheotomy are especially full and interesting.

Chloroform is recommended in many cases where a light general anæsthetic is indicated. This advice might be misleading to students reading the book. It is interesting to note that general anæsthesia is recommended for tonsillectomy in adults. Intra-tracheal anæsthesia in these cases is not mentioned.

In chronic antral disease, the author does not advocate the Caldwell-Luc type of operation. In severe cases he advises opening and draining the antrum through the canine fossa, rather than the more usual practice of opening through the canine fossa and establishing permanent drainage through the nose.

The final chapter on therapeutics is very compact and instructive.

Ultra-Violet Radiations and Their Uses. Robert Aitken, M.D., F.R.C.P.E., Lecturer on Diseases of the Skin, Edinburgh University, etc. 208 pages, 15 illustrations. Price 10/6. Oliver & Boyd, Edinburgh and London, 1930.

This book is a carefully compiled publication on the use of ultra-violet radiation, particularly directed towards its use in diseases of the skin. Dr. Aitken has had a large experience in the treatment of tuberculosis, particularly lupus of the skin and this experience is reflected in the manner in which he deals with this disease. The book is very readable and there is a good deal of valuable information in its pages with regard to ultra-violet light. It is recommended for the use particularly of dermatologists and those who have to do with the treatment of various skin diseases.

Pioneers of Public Health. The Story of some Benefactors of the Human Race. M. E. M. Walker. Foreword by Sir Humphry Rolleston, Bart., G.C.V.O. 269 pages, illustrated. Price 12/6 net. Oliver & Boyd, Edinburgh and London, 1930.

On the façade of the new building of the London School of Hygiene and Tropical Medicine there have been graven in bold relief the names of twenty-one pioneers who first explored the fields of public health and tropical medicine. That the student and visitor entering the building, and the passer-by on Gower Street, may know something of these great men whose names stand out that all may read, Mrs. Walker has written a series of essays, sketches of the lives and works of these eminent men of science. In the eight to fifteen pages devoted to each the author has given an outline of his life and work in such a delightful form as will stimulate the reader to seek further information in the more extended biographies from which Mrs. Walker has gathered her facts. She tells us of Sydenham who was as great an epidemiologist as a clinical observer; of Sir John Pringle, the pioneer in military hygiene; James Lind, the pioneer in naval hygiene; Johann Peter Frank, the true pioneer of modern hygiene in Europe; Jenner who anticipated preventive medicine; Shattuck, Chadwick and Farr, who laid the foundation of vital statistics and of board of health; E. A. Parkes and John Simon who made public health and its administration a special work; Pettenkofer, the pioneer of practical hygiene; Pasteur, the pioneer of bacteriology; Koch, who showed the relations of bacteriology to medicine and with his pupils in a dozen years discovered the etiological agent of eleven important human diseases; Lister, who applied the knowledge of bacteriology to surgery and hospital infection; Reed, Gorgas, and Leishman, with their brilliant discoveries in tropical medicine, followed by practical sanitation freeing many fever-infected areas from deadly scourges; and Biggs the altruistic worker and administrator in preventive medicine. They are great men all and true pioneers of public health.

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A. System of Bacteriology in Relation to Medicine.

By various authors. Vol. I. 374 pages, illustrated. Price £1.1, London, H. M. Stationery Office, 1930.

This, like the other volumes of this system already issued, is a most comprehensive and yet concise treatise on the subjects concerned. Its nine chapters are devoted to the history of bacteriology and the morphology and physiology of bacteria. The history of a science is not always easy of access, and that of bacteriology is no exception. In the first chapter this story is set forth with a continuity and correlation which gives one a clear and connected idea of the subject. From the time that Leeuwenhoek first observed microscopic living creatures in stagnant water, the development of bacteriology is traced in the dominating ideas selected from the original works of the masters up to the beginning of the 20th century. From this period, the various ramifications of bacteriology which have developed into numerous specialties, are dealt with in the succeeding chapters on the morphology, physics, metabolism, growth and reproduction, and respiration of bacteria.

An important chapter is that dealing with the theory of disinfection. The general principles of nomenclature and classification are fully discussed, with a view to an ultimate international agreement on this very important matter. In the concluding chapter there is a discussion on the various phases of variation, particularly hereditary variation.

This volume will perhaps most interest the specialists in bacteriology. Its relation to medicine is more indirect than the other volumes seen by the reviewer, yet none the less important. It not only supplies an enormous number of facts concerning the physiology of bacteria, but with its extensive bibliographies, forms a sound basis for the further study of many phases of bacteriology.

Mental Aspects of Stammering. C. S. Bluemel, M.A., M.D., L.R.C.P. (Lond.), M.R.C.S. (Eng.), Clinical Instructor in Neurology at the University of Colorado School of Medicine, etc. 152 pages, illustrated. Price \$2.50. The Williams & Wilkins Co., Baltimore, 1930.

The keynote of this work is that "Stammering is an . . . impediment of thought and not an impediment of speech." The author reviews the various exciting factors in the onset of stammering, such as fright, imitation of or association with stammerers, illness and other causes. He then proceeds to show the various manifestations of this condition, as associated with disturbances of respiration or articulation, often accompanied by facial or bodily contortion and expressing themselves in stumbling over particular letters or words or speech in general. He discusses the variations and degrees in stammering and the influences that diminish or increase that habit.

After a concise yet simple review of the mental processes involved in the production of speech, he makes an interesting digression to the psychoneuroses. In the course of this he points out that stammering is not limited to speech, but that there are cognate forms in swallowing, breathing, walking, writing, tic-like movements, and in playing various instruments. He correlates all these forms in his main theme that stammering is an impediment of thought and not of speech, but

fails to account for the admitted fact that these victims do not stammer when they sing or speak in disguised voices.

In a chapter entitled "Recoil," he offers his interpretation of the imperfect correlations in mental mechanisms leading to imperfect speech and stammering. Next, he propounds his methods of thought correction and variegated forms of speech drill by which he tries to correct the defect.

Though there is little that is new here, and no reference is made to Orton's recent important work attributing the occurrence of stammering to the correction of left-handedness, this book is otherwise scientifically up-to-date. There are few such works on the market, and as the physician and layman are generally ignorant in this subject there is a place for this book, whether for a grasp of the subject or in regard to the treatment of the patient. It is eminently readable.

BOOKS RECEIVED**Dictionary of Biological Equivalents. German-English.**

Ernest Artschwager, Pathologist, Bureau of Plant Industry, U.S. Department of Agriculture. 15,000 terms included, illustrated. Price \$4.50. Williams & Wilkins Co., Baltimore, U.S.A., 1930.

United Fruit Company Medical Department. Eighteenth Annual Report, 1929.

Excessive Menstrual Bleeding, Its Treatment by X-Rays, and the Management of Patients Suffering from Cancer of the Breast. Francis Hernaman-Johnson, M.D. (Aberd.), D.M.R.E. (Camb.), Radiologist to the French Hospital, London, etc. 24 pages. Price 2/-. H. K. Lewis & Co. Ltd., London, England, 1930.

Acta Chirurgica Scandinavica. Various authors. Vol. 67. 977 pages. P. A. Norstedt & Soner, Stockholm, 1930.

The Behaviour of the Newborn Infant. Karl Chapman Pratt, Ph.D., Amalie Kraushaar Nelson, Ph.D., and Kuo Hua Sun, Ph.D. Supervised by Albert Paul Weiss, Ph.D., Professor of Experimental Psychology, the Ohio State University, and Andrews Rogers, M.D., Professor of Obstetrics, Ohio State University. 238 pages. Price \$3.00. Ohio State University Press, Columbus, Ohio, 1930.

Hospital Year Book. 10th edition. Price \$2.50. Modern Hospital Publishing Co., Chicago, 1930.

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treated by irradiation, yielded primary healing in 92.5 per cent, with permanent healing in 86.5 per cent, on a basis of five years. The far advanced cases, treated by irradiation, have shown primary healing in 39 per cent of thirty-three cases, with permanent healing in 11 per cent on the five year basis.—*J. Am. M. Ass.* 94: 1475, May 10, 1930.